

Journal

OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

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Journal of the American Veterinary Medical Association

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EDITORIAL STAFF: W. A. Aitken, Editor in Chief; Donald A. Price, *Associate Editor*; H. E. Kingman, Jr., *Managing Editor*; Eva G. Bailey, *Assistant to the Editors*.

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Correspondence

August 5, 1958

Dear Sir:

I don't suppose that it will do any good but I feel conscience-bound to protest the indiscriminate use of anglicized plural forms, especially if it results in such barbarous abortions as "inoculums" (not to mention "lumens," "mediums," etc.; the mere sound of which makes my cochlea stand on end). I have not seen such ludicrous corruption of language since I read "The Education of Hymie Kaplan."

Many journals accept "sera," "indices," and "foramina" as readily as their martyred vulgarizations. It is difficult to see any objections to permitting such latitude. The words are unequivocally clear, are equally acceptable in oral discussion or lecture, and even reflect some measure of literacy, which used to be permissible in scholarly work.

My resistance to your anglicized substitutions does not stem from my devotion to the classics, but from the realization that the authors' individuality is crushed in a vise of an arbitrary and needless uniformity.

And what about "cesarotomy," a word that has appeared with increasing frequency in the JOURNAL. It is perhaps intended to displace "cesarean section." The derivation of "cesarotomy" suggests an operation on Caesar, which this isn't and never was even if the Emperor was delivered by cesarean section. In that case, cesarectomy might do or perhaps "aureliotomy," since this would at least acknowledge the fact that the cutting is best done on the mother rather than the infant (Dorland's absurd attempt to derive the term from caedere, to cut, deserves no comment). For an editorial staff that takes exception to "autopsy," epidemiology," and "sacrifice"—a superb description of killing for the sacred purpose of obtaining needed infor-

mation or material—to put up with "cesarotomy" is like Carrie Nation owning preferred stock in a distillery.

I rest my case. If an author has something of significance to say and can say it intelligibly, let it be his language in which he expresses himself. If he can not make himself understood, the trouble usually lies where it can not be remedied by rigid standardization of style.

Very truly yours,
s/ERNST L. BIBERSTEIN
Davis, Calif.

[The style used in the Journals has been established over a period of many years and is patterned chiefly on Webster and Dorland. Few will agree with all its details. Cesarotomy is accepted by Dorland. Regardless of its source, it is concise and specific.—ED.]

Excerpts from Letters to the Editor

In addition to the above letter, the following excerpts from letters indicate typical reactions of representative numbers of other authors, all of them quoted anonymously.

April 25, 1958

I would like to commend the reviewer and editors for their careful analysis of the paper and their most helpful suggestions.

• • •

April 28, 1958

Thank you for the careful attention you extended to this paper and also to those we have submitted in the past.

• • •

June 3, 1958

We feel impelled to take strong exception to many of the editorial revisions and implied criticisms.

We do not feel that "peculiar sentence structure" was used in the original manuscript. Most of the revisions, corrections, and modifications on the returned manuscript merely reflect an individual's personal preference of style and word usage, and in no way improve the ability of the manuscript to communicate ideas to a reader. In a few instances, the entire thought of a passage is modified.

[When "the thought . . . is modified," it usually indicates that the meaning was unclear in the original paper. Authors should write so they "can't be misunderstood."—ED.]

• • •

April 29, 1958

It is evident that the reviewer has done a very thorough job with our manuscript. We are in accord with all of his suggestions, and the manuscript has been corrected accordingly.

(Correspondence continued on ad., p. 6)

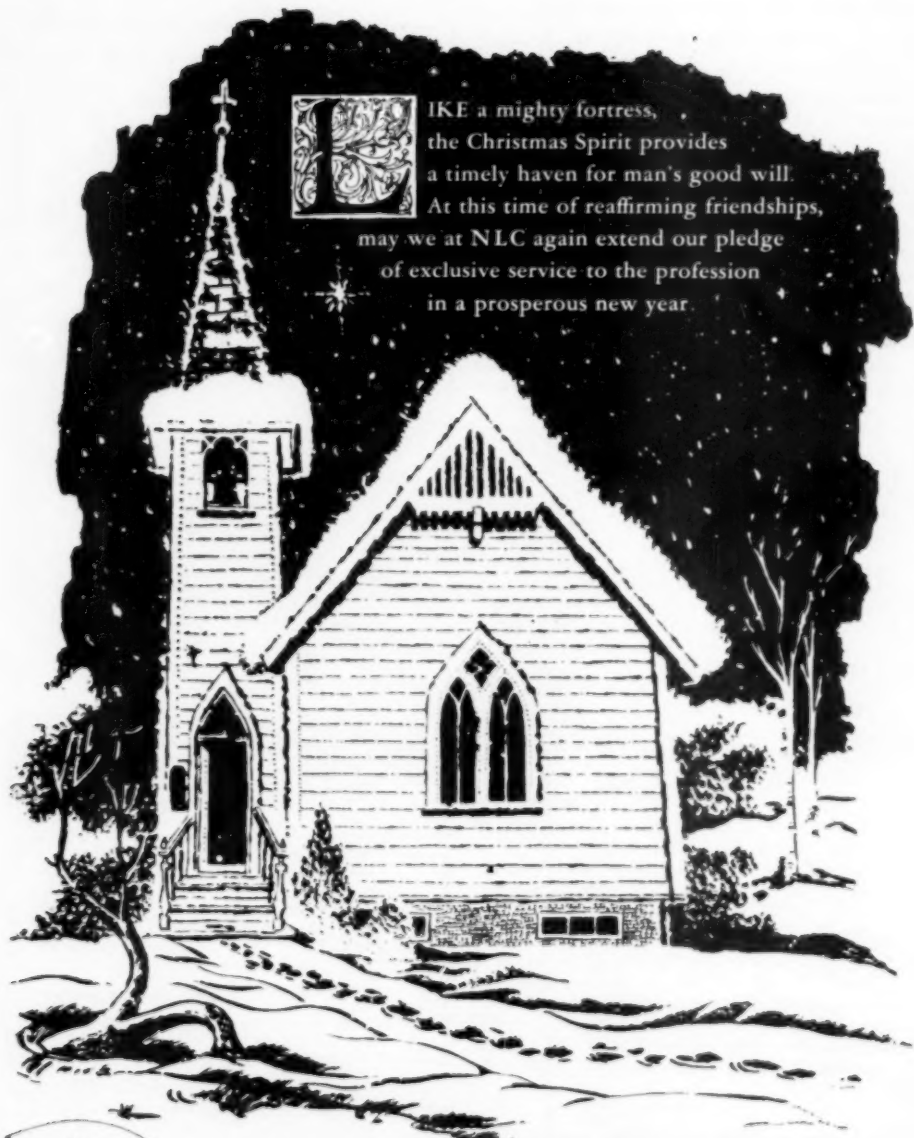
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Correspondence—continued

May 20, 1958

Please convey to the editor our very real appreciation of his efforts. The manuscript benefited greatly.

• • •

Sept. 17, 1958

Many of the suggestions you made . . . are excellent . . . One of our staff, who devoted 15 years to Greek and Latin and is sensitive to the abuses to which they are subjected, refuses to have the term "euthanatize" in the paper.

[A verb form for euthanasia was needed, so euthanatize was adopted upon the advice of a Greek scholar. The "sia" was replaced with "tize" as is done with anesthesia. While not in American dictionaries, *euthanatize* is mentioned in the Oxford dictionary as a nonce-word, i.e., one used for a particular occasion but not adopted into general use.—ED.]

• • •

Sept. 25, 1958

The complete job of editing that you did on the paper is very much appreciated by me. Material becomes so familiar to the person working with it that when written up there are often thoughts, phrases, or interpretations of ideas that one automatically or unconsciously reads into the material so it makes sense to the writer but may leave the reader completely "at sea." I have made the changes you suggested and believe they have improved the paper though I realize that at times there may be several ways of writing the same material.

• • •

May 6, 1958

The summary and conclusions were changed drastically as suggested. We have never before received such suggestions by the reviewer, but are still happy to oblige where we feel it will not cause the manuscript to suffer from deletions.

• • •

Sept. 30, 1958

I think you will find that the present draft contains the several suggested changes, all of which were regarded as definite improvements . . . Many thanks for the time and effort that you have given in our behalf in getting this paper in publishable form.

• • •

Sept. 17, 1958

I am forced to voice strong objections to the manner in which the manuscript was edited. We seem to have reached a stage in scientific writing where freedom of expression and thought are suppressed in favor of conformity to a particular style.

[This author later tempered his criticism.—ED.]

• • •

July 28, 1958

Thank you very much for the time and effort you took in reviewing and editing our manuscript.

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-----------------------------	------------

I must congratulate you on your expert knowledge of English and skill in sentence structure.

• • •

Sept. 25, 1958

You and your staff have done a very fine job with a cumbersome article.

• • •

Oct. 28, 1958

I want to express my personal appreciation for the excellent job of editing which was done. I feel that the revised version does a better job of presenting the data which we have accumulated. I hope that the revisions meet all of the objections raised.

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Cattle Diseases Call for Veterinary Check

Three new transmissible diseases of cattle have added their threat to the farm profit picture, according to a report today by the American Foundation for Animal Health.

Diagnosis by a veterinarian in instances of these diseases is doubly important, because of similarity in the symptoms, and their several other cattle diseases are

Veterinarians Solve Repeat Breeding

By having the veterinarian examine and treat cows, the herd owner can help solve the problem of repeat breeding, according to experimental work cited today by American Foundation for Animal Health.

Treatments by a veterinarian reduced the number of breedings necessary for a cow to produce a calf, and also brought improvement in other

Alert Sheep Men on Pregnancy Disease

This is the season when sheep owners may expect signs of pregnancy disease to show up among ewes, the American Foundation for Animal Health warned today.

If a veterinarian is called promptly after the first symptoms are noticed, he can usually prevent the disease in the balance of the flock, and save a percentage of the flock, and save a percentage of the flock, and save a percentage of the flock.

Tens of thousands of animal owners are now reading about modern veterinary service in their local newspapers. They are being alerted to animal disease hazards . . . and learning to call their veterinarian as the best safeguard against losses.

Nearly 3,700 newspapers are being furnished with this year's round, coast-to-coast news service by American Foundation for Animal Health, the educational bureau of Associated Veterinary Laboratories. Yet this is but one of many steps in the nation-wide public relations campaign for the profession being underwritten by this group. Other phases include farm magazines, radio, television . . . every major channel of mass education.

This campaign is made possible by the ethical companies listed on the opposite page. It will be genuinely appreciated if you will bear them in mind in supplying your requirements.



IN THE NEWS

Unusual Lengths

Last week, the U. S. sought to
use the Nixist protest as a basis
for reviving long-standing World-
War proposals for Austria inspection.
The proposal was a surprise attack. The
plan was abandoned over last
weekend for Henry Cabot Lodge,
U. S. Ambassador to the U. N. All that
remains is the U. N. Security Council
to discuss the matter.

EWS

Veterinarian is Key to Control of Erysipelas

A 3-point program to help farmers control swine erysipelas, now one of the top causes of heavy losses to hog producers, was recommended this week by the American Foundation for Animal Health.

First—In areas where erysipelas has occurred, a veterinarian should outline a planned, year-round vaccination program for both breeding stock and growing pigs.

Second - If any unexplained, sudden deaths or suspicious symptoms are seen, prompt veterinary help should be obtained, in getting a correct diagnosis. This is important, as erysipelas is easily confused with hog cholera.

Third—Farmers should isolate newly-purchased swine, keeping them away from the home herd for at least three weeks. This will allow signs of the disease to appear in the new animals.

Curbs for High Court?

For months there has been brewing in the Senate a storm over the Supreme Court. The storm arose from a series of recent Supreme Court decisions asserting individual rights against Government of the circle, some diameter is 3,000 miles. The U. S. (Alaska), Canada, Finland, Sweden, Norway, Ireland and Denmark (Greenland). Along the route, to U. S. Canadian and Soviet sea lanes and possibly some Soviet trade launching sites.

The Arctic has long without
is one of the fundamental facts of
the East-West struggle: long-
range bombers and missiles have
made the "over the top" route—
the shortest distance between
any points in the U. S. and Rus-

SUMMIT ROAD SEEN HARDER

direct negotiations on the
basis for a summit conference
the machinery has gotten
the Western Big Three to
the past three weeks have been
trying to persuade the Soviet Un-
ion to meet jointly with them in
diplomatic talks in Moscow.
Foreign Minister Andrei Grom-
yko, however, has refused
meeting with the Western Am-
bassadors indefinitely. If the
Three want a joint meeting, Grom-
yko has said, then Poland
and Czechoslovakia should be in-
cluded in the diplomatic talks to talk
over on each side.

Yesterday, the Big Three met Moscow, only accepting what they regarded as the less serious of the alternatives. They said they would reluctantly agree to the 100,000 divisions because "the desire to move ahead with it work itself . . . and it does not mean that the Soviet Government agrees that the proposed 100,000 divisions substantiate policy."

Demand Agreement

Whether the Soviet Union is actually ready to discuss disarmament issues, however, is still far from clear, and the Security Council also has not made any progress for optimism at this time. Moreover's position has been that preliminary negotiations could drag on for months if not a year, without the aid of the United Nations, which the Soviet Government would refuse to accept. That could be a serious setback, but while Russia is not ready to discuss it, it is not a serious situation of a serious nature.

STUDY OF SCHOOLS IN SUBURBS IS

Impact on New Resident
Problems Is Subject
Project at Columb

Last Tuesday
April, 1968, were
arrested ten days
ago, apparently in the
administration's belief
of bolstering
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Washington News



Legislative Action.—The 86th Congress, to convene Jan. 7, 1959, will have a large Democratic majority and will change the party ratio of most committees. Chairmanships, however, will not be affected to any great extent.

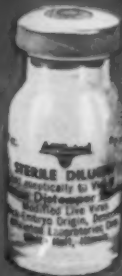
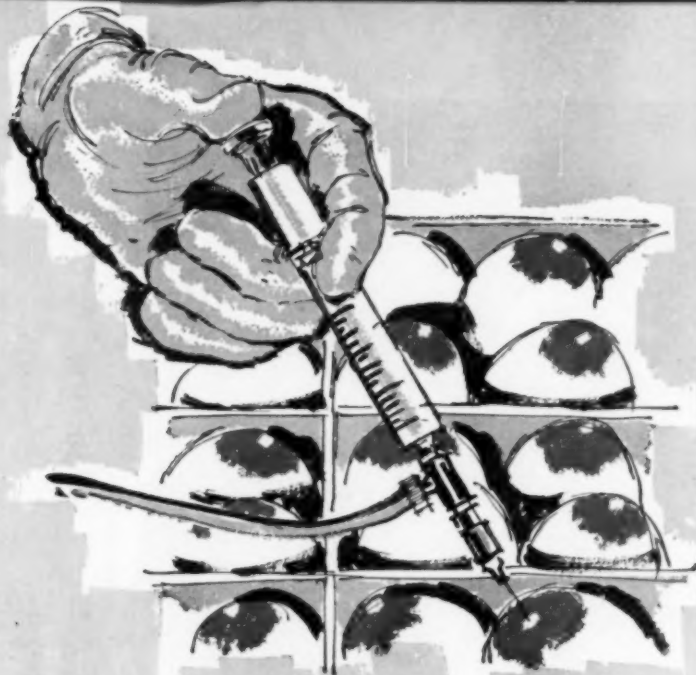
The **Advisory Committee**, appointed by **Secretary of Agriculture Benson** under the provision of P.L. 85-765, is to work with U.S.D.A. in **developing new and improved methods of humane slaughter** (see JOURNAL, Oct. 15, 1958, adv. p. 8), and met in Washington November 13 and 14. Secretary Benson attended the initial gathering on November 13, gave a brief history of legislative action from 1955-1958, and defined the responsibility of the department in carrying out the provisions of the Humane Slaughter Act, as well as that of the committee in working with the department. Members representing the various groups were:

National organizations of slaughter: **T. H. Broecker**, Chairman of the Board of the Klarer Company, Louisville, Ky.; and **Donald S. MacKenzie**, director, Department of Packing House Practice for the American Meat Institute, Chicago. **Trade union movement:** **Russell E. Dresser**, Director of International Packing House Department, Amalgamated Meat Cutters and Butchers Workmen of North America, Chicago. **General public:** **Miss Sally Butler**, Legislation Director, General Federation of Women's Clubs, Washington, D. C. **Livestock growers:** **Don C. Collins**, American National Cattlemen's Association, Kit Carson, Colorado, and **E. Howard Hill**, president Iowa Farm Bureau Federation, Des Moines. **Poultry Industry:** **John Hargreaves**, Carolene Poultry Farms, Federalsburg, Md. **Humane organizations:** **Rutherford T. Phillips**, Executive Director, American Humane Association, Denver, Colorado, and **John C. MacFarlane**, Field Director, New England Livestock Conservation, Inc., Boston, Massachusetts. **National veterinary organization:** **Dr. James R. Hay**, American Veterinary Medical Association, Chicago. **Religious faiths with respect to slaughter:** **Rabbi Joseph B. Soloveichik**, Professor of Talmud, Veshiva University's Theological Seminary, New York City. **Representing U.S.D.A.** and chairman of the committee, **Dr. C. D. Van Houweling**, ARS.

* * *

Miscellaneous.—**HEW Secretary Fleming**, in a talk to the **Association of Land-Grant Colleges** during the 72nd annual convention in November, announced that the **National Institutes of Health** is conducting a study to learn how research grants from the federal government affect medical schools as a whole. He also warned against the danger of federal influence on education if U. S. grants make up too large a part of the schools' budget. The Secretary said, "The federal government and our institutions of higher education have entered into a far-flung and tremendously significant partnership. I think it is significant that the President and Congress have said that the time has come to evaluate this partnership—not from the standpoint of its impact on the federal government but from the standpoint of its impact on institutions of higher education."

The Rockefeller Foundation has made a grant of \$10,000 to support the **Pan American Zoonoses Center**, Azul, Argentina. **Dr. Fred L. Soper**, director of the Pan American Sanitary Bureau, regional office for the Americas of WHO, said that the money will help finance the activities of a technical advisory group of zoonoses problems in the Americas. The Advisory Group members who met at the Center the week of November 16, includes: Drs. **Paulo Antunes**, School of Veterinary Medicine, Sao Paulo, Brazil; **Teodoro Ramos Saco**, dean, School of Veterinary Medicine, Lima, Peru; **Richard E. Shope**, Rockefeller Institute for Medical Research; **James H. Steele**, chief Veterinary Public Health, CDC; and **Frank A. Todd**, ARS, U.S.D.A. Members of the Secretariat are: Drs. **Benjamin Blood**, director, Pan American Zoonoses Center; and **Earl C. Chamberlayne**, Communicable Disease Branch, P.A.S.B.



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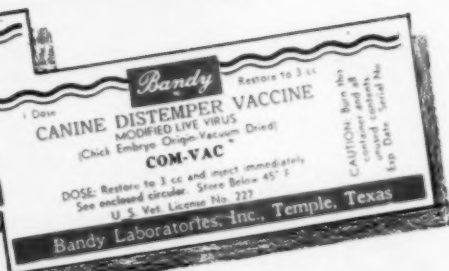
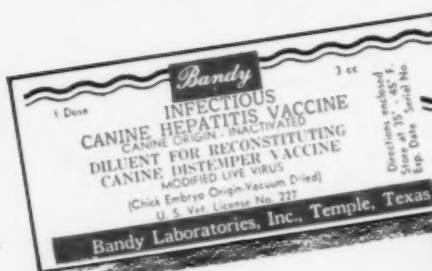
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ULTRACORTENOL has been extensively tested and enthusiastically accepted by a number of small- and large-animal practitioners¹⁻¹⁰ who found these regimens to be highly effective:

Dairy Cow	Ketosis (acetonemia)	Single 100- to 200-mg. injection*
	Shock ("downer" cow) syndrome	Single 200-mg. injection as supportive therapy.
Dog	Dermatoses	5 mg./10 pounds body weight, total single dose not to exceed 20 mg. For sustained therapy, repeat once or twice a week as indicated.
	Inflammatory joint conditions	5 mg./10 pounds body weight, total single dose not to exceed 20 mg. Supportive oral therapy not necessary.

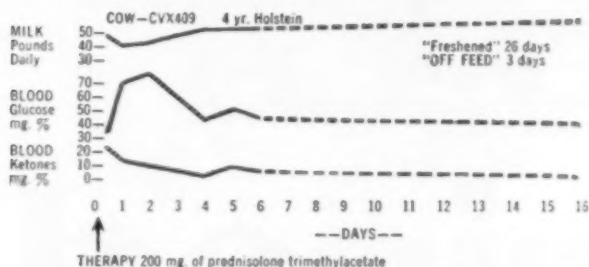
*This initial injection may be reduced to 50 to 100 mg. intramuscularly if simultaneous administration of intravenous glucose is given, thus permitting more economical glucocorticoid therapy. If necessary, either regimen may be augmented by an additional injection of 50 to 100 mg. Ultracortenol after 24 to 48 hours.

C I B A Effective Veterinary Drugs, Products of Exacting Research

New injectable glucocorticoid

BOVINE KETOSIS Following a single intramuscular injection of Ultracortenol, investigators observe that:

- appetite is restored, depression is dispelled within 12 to 24 hours¹
- blood glucose levels are raised within 12 hours¹
- blood ketone levels return to normal within 24 to 96 hours¹
- a steady increase in milk production begins after 48 hours.²



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(Adapted from Vigor¹)

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References: 1. Vigor, R. F.: J.A.V.M.A. 133:326 (Sept. 15) 1958. 2. Shaw, J. C.: Personal communication. 3. Pollock, S.: To be published. 4. Rabin, P. H.: Personal communication. 5. Hoffer, S. H.: Personal communication. 6. Weir, H. T., and Hazelrig, J. W.: Personal communication. 7. Beck, J. W.: Personal communication. 8. Bull, W. S.: Personal communication. 9. Fessenden, P. E.: Personal communication. 10. Lohmeyer, C.: Personal communication.

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1. Charles Raker, V.M.D., Professor of Veterinary Surgery, University of Pennsylvania. Annual Meeting of the American Veterinary Medical Association, Aug. 18-21, 1958, Philadelphia, Pennsylvania.

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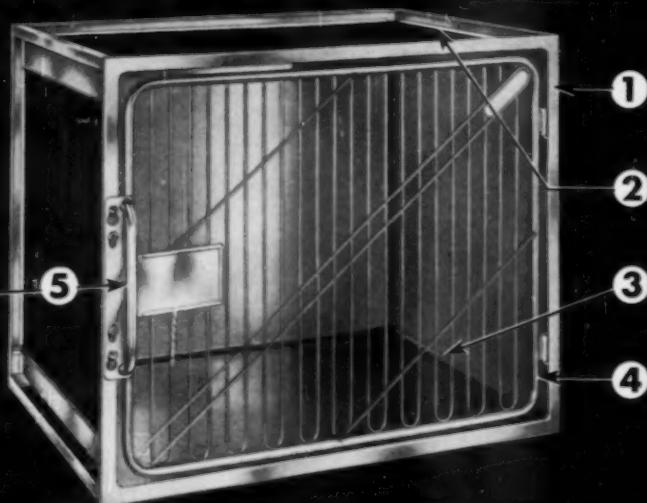


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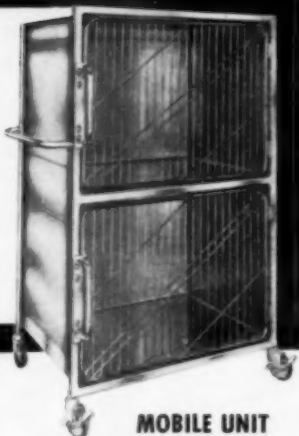
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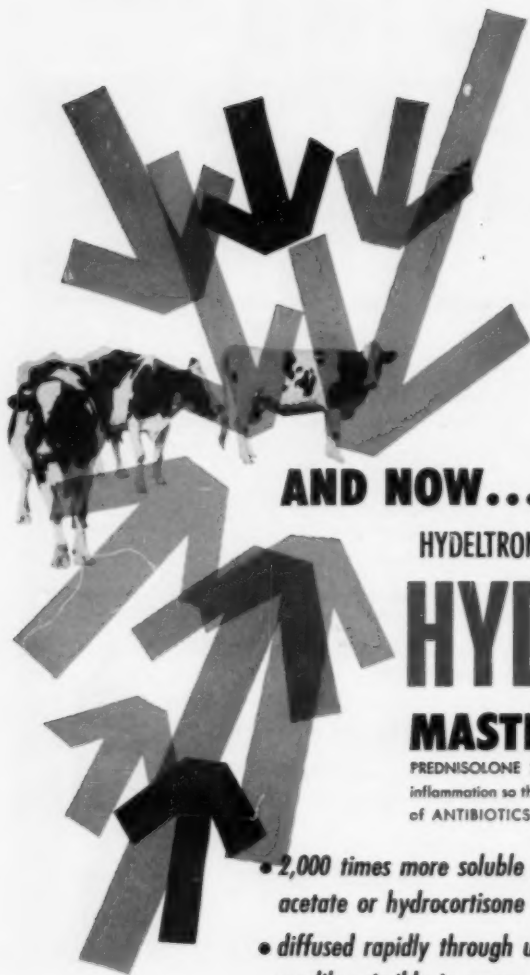
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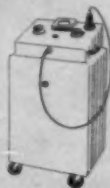
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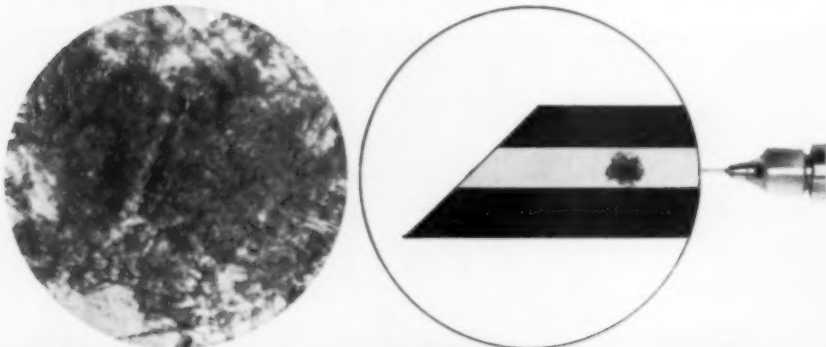
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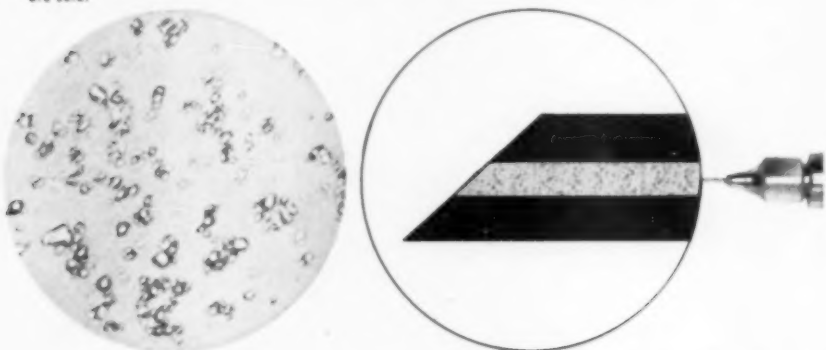
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Surgical Removal of Canine Heartworms by Pulmonary Arteriotomy

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Columbus, Ohio

RECOGNITION of the hazards involved in the chemotherapeutic treatment of dogs heavily infected with heartworms has resulted in various methods for the surgical extraction of adult *Dirofilaria immitis*.^{2,6,7} The series reported in this paper consists of 36 operations performed on dogs with varying degrees of infection.

The first removal of adult heartworms by surgery was reported in 1950.² Ventriculotomy was performed on 2 dogs by means of a cross-suture technique, enabling the surgeon to pull worms through a small incision.

In 1954, a method was described for extracting adult heartworms by making a punch incision into the pulmonary artery and using special filarial forceps to withdraw the heartworms 1 to 4 at a time. A purse-string suture was placed around the small punch hole to minimize the loss of blood. Critical evaluation of the procedure by these investigators indicated that, although 7 dogs subjected to surgery recovered, this method of heartworm removal was time-consuming and not successful in removing adult heartworms from the right ventricle.⁷

Heartworms have been removed, under hypothermic anesthesia, by means of a high pulmonary arteriotomy performed from the right side.⁶ Blalock clamps were placed on the vena cavae, vena azygos, and aorta.

From the U.S. Army Surgical Research Unit, Brooke Army Medical Center, Fort Sam Houston, Texas. At present, Dr. Roenigk is in the Department of Veterinary Surgery, Ohio State University, Columbus.

This work was done in partial fulfillment of requirements for the M.S. degree.

PREOPERATIVE PROCEDURE

Thirty dogs of various sizes and breeds were selected for the surgical extraction of adult heartworms. None had clinical signs of cardiac failure. Preoperative preparation consisted of removing intestinal parasites and providing a balanced diet. The immediate preoperative preparation consisted of withholding food for 18 hours but offering water ad libitum.

General anesthesia was induced by the intravenous administration of pentobarbital sodium solution via the cephalic vein. The usual dose of 25 to 30 mg. per kilogram of body weight was required to obtain surgical anesthesia (stage III, plane 1). Thoracic surgery in the dog requires positive pressure respiration because of an incomplete and unstable mediastinum in this species. Oxygen (100%) was administered via an intratracheal catheter with a flow rate of 10 to 14 liters per minute. A time-cycled respirator having a respiratory cycle of 14 to 16 respirations per minute was used.

SURGICAL PROCEDURE

The left fourth intercostal space was selected as the operative area in order to facilitate exposure of the main pulmonary artery and both vena cavae. The skin incision extended from the level of the articular processes to the costochondral junction, parallel and posterior to the fourth rib. The incision was carried through the subcutaneous muscle, latissimus dorsi, the serratus ventralis, and superficial pectoral muscles.

After dividing the serratus and pectoral

muscles, the intercostal muscles were exposed and an incision was made anterior to the fifth rib. The pleura was cut during expiration to minimize the danger of incising the lung. The incision through both intercostal muscles and the pleura was enlarged

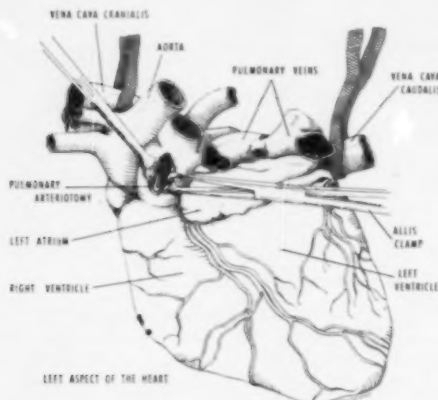


Fig. 1—Shows left aspect of canine heart and site of pulmonary arteriotomy.

dorsally to the head of the rib and ventrally to the costochondral junction. Rib resection was not necessary; the use of a self-retaining retractor permitted adequate exposure.

The heart was completely exposed by packing off the cardiac lobe of the left lung. The pericardial sac was opened 1 cm. dorsal to the phrenic nerve. As the pulmonary artery leaves the right ventricle, it appears as a thin-walled vessel covered with fat (fig. 1). It is usually dilated in severe cases of dirofilariasis, and adult heartworms are palpable within the vessel.

The preparation for occlusion of the circulatory inflow to the heart was initiated by placing umbilical tapes loosely around the anterior and posterior vena cavae. As a result, the only remaining venous supply was the azygos vein that lies completely on the right side and was difficult to reach from the left side approach.

Good mediastinal exposure was required in order to place the umbilical tape around the anterior vena cava. This vessel was isolated with a long right-angle clamp from a ventral position beneath the apical lobe of the left lung. The posterior vena cava was exposed by simply pushing the diaphragmatic lobe of the left lung anteriorly.

The incision into the pulmonary artery was made after the umbilical tapes were in place around the vena cavae. A Satinsky clamp was placed longitudinally on the pulmonary artery without obstructing the arterial supply to the lungs. A 1.5- to 3.0-cm. longitudinal incision was made through the clamped portion of the pulmonary artery. Two 5-0 silk sutures were then placed through the incision, one at each end, to prevent tearing and to facilitate reclamping of the artery. These sutures were left long and tagged with a hemostat and were used later for the closure of the artery.

Usually three minutes were ample for removing 30 or more adult heartworms. The actual removal of heartworms required only about one minute, leaving another minute to search the smaller branches of the pulmonary artery and the right ventricle. Thirty seconds should be allotted for the replacement of the Satinsky clamp on the pulmonary artery in order to re-establish normal flow of blood to the lungs.

Closure of the pulmonary artery was accomplished by using 5-0 arterial silk and a continuous suture pattern. The Satinsky clamp was removed after complete closure of the arteriotomy incision. The pericardial sac was closed by a lock-stitch or continuous suture of 3-0 silk. Before closing the thoracotomy incision, the pleural cavity was aspirated thoroughly and flushed with sterile saline solution to remove any blood. The collapsed lungs were inflated by increased, positive pressure.

Silk sutures or stainless steel wires were placed at intervals around the fourth and fifth ribs; three were usually sufficient. The ribs were approximated with the assistance of a towel clamp or rib approximator. The pleura and intercostal muscles were sutured with 3-0 chromic catgut. Catgut was also used to suture the remainder of the muscles, layer by layer.

Because the dog will be active upon recovery from the anesthetic, it is important to use an interrupted suture pattern or a continuous suture pattern with interrupted sutures for re-enforcement. The skin was approximated with sutures of silk or stainless steel wire. Needle aspiration was employed to maintain lung expansion.

A second vena cavae occlusion was instituted in 6 heavily infected dogs, since the surgeon was not certain that all of the

heartworms were removed during the first occlusion. After an interval of five to ten minutes, the vena cavae were again occluded and the pulmonary artery clamp was released. In 1 of the 6 dogs, a few additional heartworms were extracted. These worms had probably migrated or been washed into the operative area after most of the worms were extracted. In no instance was arrhythmia occasioned by the second period of occlusion.

Additional blood was needed to replace blood lost during the two openings of the pulmonary artery. Another major disadvantage was that the multiple periods of occlusion prolonged the operating time.

Postoperative Management.—Aspiration of the chest was performed several additional times to remove any air and to check for intrathoracic hemorrhage. A bandage was applied to the incision area.

All dogs were treated routinely by a daily intramuscular injection of 600,000 to 900,000 units of procaine-penicillin in oil for five days. An intramuscular injection of 0.5 Gm. of streptomycin was administered every 12 hours for three days. The bandages were removed on the second postoperative day. Usually the incision was not redressed unless the patient disturbed the sutures. Sutures were removed in ten to 14 days.

TABLE I—Summary of 36 Pulmonary Arteriotomies in Dogs

Dog	Age (yr.)	Microfilariae- /2 cc. of blood*	Heart- worms removed	Occlusion time		Remarks	Necropsy
				Min.	Sec.		
1C	12	1,750	15	1	50		
2C	15	7,000	20	2	30		Pleural adhesions.
3C	10	160,000	33	3	0		
4C	12	21,200	6	2	50		
5C	15	83,200	23	2	50		
6C	4	62,500	4	2	10		
10	9	83,000	57	3	20		
14	3	200	0	3	20		Pleural adhesions.
16	1	35,000	7	3	0	Two occlusion periods.	No adhesions.
21	9	57,350	17	3	0		
23	1/2	327	0	3	30		
26	6	44,960	25			Atrial fibrillation, incomplete occlusion.	
33	1	420	0	2	50		No adhesions.
41	10	40,000	13	2	10	Died, hemothorax.	
45	1	5,620	0	3	30		Few pleural adhesions.
50	3	15,950	5	3	30	Two occlusion periods.	No adhesions.
57	4	31,120	15	3	30		Few pleural adhesions.
61	5	2,268	0	2	50		Pleural adhesions, pulmonary artery thrombus 1 mm.
61A	14	22,000	16	2	45	Atrial fibrillation.	Pleural adhesions.
64	5	79,800	48	3	15	Two occlusion periods.	Pleural adhesions.
67	4	1,000	0	3	0	140-day interval; hemothorax.	
		1,000	0	3	0	Died.	No adhesions.
65	1	2,464	15	3	0	240-day interval between operations.	
		70	0	2	50		Pleural adhesions.
70	6	584	0	1	30	Two occlusion periods, ventricular fibrillation.	No adhesions.
73	1	110	0	3	0	180-day interval between operations.	
		10	0	2	10		Pleural adhesions.
77	10	10,640	10	3	30	Atrial fibrillation	Pleural adhesions.
78	4	445	0	3	30	130-day interval between operations.	
		600	0	2	30		
80	5	47,000	14	4	15	Died, cerebral damage.	
80A	5	15,260	44	3	10		
85	10	55,200	20	3	40	Two occlusion periods, ventricular fibrillation; 90-day interval.	
		negative	0	2	45		
87	5	31,920	20			220-day interval between operations; incomplete occlusion	
		126,272	1	3	0		No adhesions; 1 heart-worm right ventricle.

*Microfilaria immitis—microfilariae were stained and measured.

RESULTS

Thirty-six pulmonary arteriotomies were performed on 30 dogs, and a second operation was performed on 6 of the animals (table 1). Within four hours following surgery, 3 dogs died. Certain dogs were selected for a second operation in order to establish the completeness of removal of the adult heartworms. The pulmonary arteries were slightly thickened at the site of the arteriotomy but there was no thrombus formation.

Postoperative morbidity was minimal. Appetite and weight gain are two valid criteria for evaluating recuperation of a dog. All dogs were eating a standard diet within 12 hours after surgery. After two weeks, the dogs usually exceeded their preoperative weight. Hospitalization for surgical cases does not need to exceed ten days.

DISCUSSION

The possible need for cardiac resuscitation was anticipated in this series; the following measures proved valuable.

One of the superficial veins, either a cephalic or a recurrent tarsal vein, was cannulated with an 18-gauge needle. Patency of the cannula was maintained by a slow, continuous drip of 5 per cent dextrose in water. A bottle of 5 per cent dextran or whole blood was connected in the same tubing in readiness for replacement of blood volume. Whole blood was given to combat hypotension if the blood loss exceeded 200 ml. This occurred during four operations. A defibrillator was used to stop ventricular fibrillation, and cardiac massage was used to maintain circulation. The emergency cardiac medications consisted of epinephrine, molar sodium lactate, calcium chloride, and lidocaine.

One writer states⁵ that dogs critically ill from heartworm infection are poor risks for chemotherapy. There is little likelihood of improving their condition by the destruction of the adult heartworms, especially when long-standing infection has resulted in irreversible changes in the circulatory system and internal organs. An insufficient number of dogs have been treated to prove that mass destruction of adult heartworms is without particular damage. Necropsies on experimental dogs indicated the occurrence of considerable blockage of the lung arterioles by dead filariae during the treatment. Chemical

treatment was effective if instituted early in the course of the disease, especially in the young dog.

Because of the hazards involved in chemotherapy for heartworms in dogs, some veterinarians have proposed that adult heartworms be removed surgically.⁹ This procedure may be advantageous in the case of heavily infected dogs. A dog that has the right ventricle and pulmonary artery packed with worms is an extremely poor risk for chemotherapy.^{1,3-5,8-10} By the same reasoning, such a dog is indeed a surgical risk if it shows any signs of cardiac failure.

Selection of the surgical candidate proved to be an important problem. The age of the dog is important, since the development of adult heartworms takes at least eight months, and older dogs are generally infected with a greater number. This assumption has been corroborated by other investigators.⁶

A second factor in selection is the number of microfilariae. One worker described an increased number of microfilariae in the afternoon, the maximal approximately one hour after feeding.¹⁰

The consideration of age and microfilarial numbers, determined by the concentration method, serve as a diagnostic aid in the selection of surgical candidates. Severely infected dogs may exhibit clinical signs of cardiac decompensation and passive congestion. In this series, dogs, 4 years of age or older, with 10,000 microfilariae per cubic centimeter of blood, were usually moderately infected with adult heartworms (table 1). Microfilariae were stained and measured and were found to be *Microfilaria immitis*.

Estimation of the relative number of parasites in the heart would be a valuable feature in determining whether the dog should be subjected to surgery. However, studies have shown that the number of microfilariae present in the peripheral blood is not indicative of the number of adults in the heart and pulmonary artery, nor do present clinical diagnostic methods reveal the number of adult heartworms.

The removal or destruction of heartworms must be economically feasible, regardless of the mode of treatment. When deciding on surgery or chemotherapy, the over-all cost is approximately the same if consideration is given to the length of hospitalization. Modern surgical methods have

made cardiac surgery a relatively safe procedure. In comparison to chemotherapy, surgery may be a safer procedure in the case of a severely infected older dog.

The following criteria were established for the purpose of evaluating the procedure:

(1) Any surgical operation must be practicable if it is to be adopted for veterinary practice; in addition, it should not consist of an elaborate technique.

(2) The surgical procedure must be relatively safe and result in a low morbidity.

(3) A successful surgical operation should remove at least 90 per cent of the heartworms and render the dog free of clinical signs of the disease.

It is doubtful that any method of treatment can salvage dogs that exhibit severe signs of cardiac decompensation. The lesions created by the severe chronic passive hyperemia may be too far advanced for resolution. However, surgical removal of the offending heartworms should be considered.

Pulmonary arteriotomy offers a possible solution to successful removal of most of the adult heartworms. The associated problems of hemorrhage and surgical speed are overcome by means of vena cavae occlusions and a pulmonary artery forceps. Since the heart is not traumatized by surgical incision, the probability that cardiac arrhythmia might develop is decreased considerably.

SUMMARY AND CONCLUSIONS

A technique is described for the surgical removal of canine heartworms by pulmonary arteriotomy. In a series of 36 operations, the method of surgical extraction of adult heartworms proved safe and effective.

The technique of vena cavae occlusion and the maintenance of pulmonary circulation eliminated the problem of hemorrhage and surgical speed in performing the operation. An occlusion time of three and one half minutes proved to be ample for the extraction of heartworms. Pulmonary arteriotomy eliminated the hazards associated with ventriculotomy, especially cardiac fibrillation and standstill. Necropsies performed on 16 dogs treated surgically showed complete removal of adult heartworms with the exception of 1 dog in which 1 worm was found in the pulmonary artery.

Pulmonary arteriotomy should be con-

sidered as a therapeutic procedure for the surgical removal of adult canine heartworms in selected cases of heartworm infection.

References

- ¹Drudge, J. H.: Arsenamide in the Treatment of Canine Filariasis. *Am. J. Vet. Res.*, 13, (1952): 220-235.
- ²Essex, H. E.: Certain Operative Procedures in the Mammalian Heart. *Vet. Med.*, 45, (1950): 85-87.
- ³Foley, R. J.: The Treatment of Canine Filariasis. *Vet. Med.*, 45, (1950): 485-491.
- ⁴Jackson, R. F.: The Treatment of Heartworms with Arsenamide, a Phenyl Arsenoxide. *J.A.V.M.A.*, 115, (July, 1949): 17-22.
- ⁵Jones, L. M.: *Veterinary Pharmacology and Therapeutics*. Iowa State College Press, Ames (1954): 526-533.
- ⁶Knowles, R. P., and Wasman, S. C.: Hypothermia by Cold Temperature. *Vet. Med.*, 51, (1956): 26.
- ⁷Kurokawa, K., Odaira, S., Hideyuki, H., Moriwaki, H., Yeshizaki, S., and Sakimoto, Y.: Surgical Treatment of Canine Cardiofilariasis. 1. On the Operative Method Extracting Filaria from the Pulmonary Artery. *Bull. Nippon Vet. & Zootechnical College No. 3* (July, 1954): 67-72.
- ⁸Otto, G. F.: Problems in the Treatment of Heartworms, *Dirofilaria Immitis* of Dog. *M.S.U. Vet.*, 16, (1955): 1.
- ⁹Owens, Karl, Dibbel, C. B., Minnick, R. F., Kirkpatrick, D. Y., Jackson, R. F., and Yarrow, J. H.: Panel on Heartworms. *Proc. Book, AVMA* (1950): 235-238.
- ¹⁰Schnelle, G. B., and Young, B. M.: Clinical Studies on Microfilarial Periodicity in War Dogs. *North Am. Vet.*, 25, (1944): 679-680.

Examination of British Guide Dogs

The Council of the British Veterinary Association has joined forces with the Guide Dogs for the Blind Association in an effort to provide a twice annual health examination for the guide dogs belonging to blind people.

The veterinary association is encouraging all of its members to participate in the plan and it was announced that veterinarians who are required to make journeys for the purpose of making the examinations will be reimbursed therefor by the Guide Dogs for the Blind Association. The latter will supply each owner with a small health record book in which the veterinarian will inscribe the results of his examination. The owners will detach a carbon copy and forward it to the training center he attended. —*Vet. Rec.* (Oct. 11, 1958): 837.

The Relative Efficiency of the Milk Ring Test and Area Blood Tests for Bovine Brucellosis

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THE STATE of Wisconsin achieved the status of a modified-certified brucellosis-free area on June 6, 1956. This was accomplished after many months of cooperative work between the local practitioners, state-federal veterinarians, milk processing plants, and the herd owners.

The milk ring test¹ was used semiannually as a means of locating the infected herds beginning in July, 1951.

Dairy herds were blood tested in accordance with the results of the ring test, while all beef herds and other nonring test herds were blood tested once a year. On the first ring test, 41.4 per cent of the herds had suspicious reactions. This percentage decreased on each successive semiannual ring test and was 3.8 per cent on the thirteenth test which was completed in November, 1957.

Herds in the state were on a voluntary plan A* basis until January, 1955. At that time, more than three fourths of the counties had voluntarily adopted the plan A program; consequently, the entire state was placed under plan A.

In a previous study,² there was 96.2 per cent agreement between the sero-agglutination and ring test results when a blood test was used after the ring test in nine counties. Similarly, another worker³ re-

ported only 1.06 per cent positive sero-agglutination reactions in 483,258 herds negative to three successive ring tests. Since the completion of the work described in this paper, the results of county-wide sero-agglutination tests in 14 Minnesota counties have been compared with the ring test histories of the herds.⁴ The number of reactor animals found in herds with negative ring test histories in the six certified counties represented 0.09 per cent of the total animals tested in those counties. The corresponding value for the eight noncertified counties was 0.04 per cent.

In spite of this type of evidence, the adequacy of the ring test applied semiannually in establishing and maintaining areas free from infection, without periodic area-wide sero-agglutination tests, has been questioned. The extreme dilution of agglutinins in the milk of large numbers of normal cows might be expected to contribute to an increasing proportion of falsely negative ring tests in areas where the prevalence of infection has been materially reduced.

The objective of the present survey was to furnish more information on the efficiency of the ring test in an area which had become modified-certified brucellosis-free on the basis of this test.

MATERIALS AND METHODS

The ring test results obtained in two selected Wisconsin counties were compared with the state average (graph 1). Calumet County was declared a modified certified brucellosis-free county on Sept. 1, 1955; Oconto County, on Jan. 1, 1956.

Complete sero-agglutination tests were conducted and bacteriological investigations were made to determine the status of infection of reactors disclosed in herds with negative ring test reactions. Agglutination tests employing acidified plate antigen⁵ were also conducted to further determine the efficiency of the procedure with respect to nonspecific sero-agglutinins.

The whey test^{1,2} also was used on the milk of reactors and suspects to compare it with other diagnostic tests employed in the survey.

The counties were tested sequentially. The personnel conducting the ring tests moved into each

This work was done while Dr. Janney was stationed by the Animal Disease Eradication Division at the University of Wisconsin, Madison; Dr. Berman is professor of veterinary science, University of Wisconsin; and Dr. Erdmann is chief state-federal veterinarian of Wisconsin.

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The authors acknowledge the efforts of the veterinary practitioners of Calumet and Oconto counties and of the state-federal veterinarians in procuring blood and milk samples; of Mr. Dean Ruedy and others at the State Animal Disease Diagnostic Laboratory in conducting the agglutination tests.

*Plan A—Test and slaughter of reactors, with or without calf vaccination.

county and tested the milk from all the herds at the dairy plants. This required about one week. The following week, the local practicing veterinarians, and the state-federal veterinarians needed to complete the testing in four weeks, began collecting blood samples. All animals except those officially vaccinated under 30 months of age, calves under 8 months of age, steers, and spayed heifers were tested regardless of the results of the ring test of the herd. The blood samples were picked up by a courier and delivered to the Animal Disease Diagnostic Laboratory the same night.

The samples were tested by the sero-agglutination rapid plate procedure, recommended by the Animal Disease Eradication Division, and all serums showing any agglutination reaction were also tested with the acidified plate antigens (APA) at pH 4.0, 3.7, and 3.4. The results of the sero-agglutination test were returned to the veterinarians by the courier, along with four sterile 15-ml. screw-capped tubes for each reactor. These tubes were used by the veterinarian to collect quarter milk samples, for bacteriological examination, at the time he branded and tagged the reactors. The milk tubes were picked up the same day and delivered to the laboratory along with that day's blood samples.

Gravity cream (0.2 ml.) of the quarter milk samples was inoculated onto "W" agar plates² and the inoculum spread over the surface with sterile bent glass rods. The inoculated plates were incubated at 37 C. for seven days with 10 per cent CO₂ added to the atmosphere. Guinea pigs were inoculated intraperitoneally with 2 ml. of gravity cream from reactors which were from herds negative to the ring test. The guinea pigs were killed 30 days postinoculation, the serums were tested for the presence of *Brucella* agglutinins, and ten tissues (spleen, liver, kidney, testis, and the following lymph nodes: cervical, axillary, prefemoral, bronchial, iliac, and hepatic) were cultured on *Brucella* agar (Albimi *Brucella* agar^{2*}) for seven days at 37 C. with 10 per cent CO₂ added.

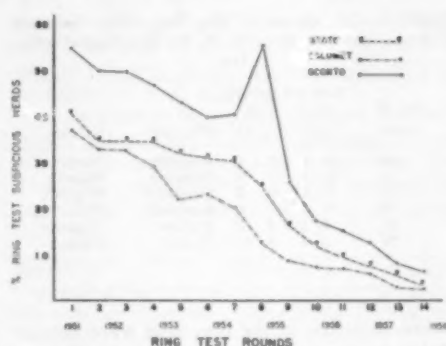
TABLE 1—Results of Ring Tests and Bacteriological Studies on Sero-Agglutination Positive Cattle

Ring test ratings	No. of herds	No. of cows	Culture positive herds	Culture positive cows
—	15	15	2	2
2+	2	2	0	0
3+	6	12	4	6
4+	18	33	13	21
Totals	41	62	19	29

Suspicious colonies were tested for their ability to agglutinate with immune serum prepared against *Brucella abortus* and with normal serum as a negative control.

Why agglutination tests using ring test antigen^{1,2} were also performed on these milk samples.

*Albimi *Brucella* agar prepared by Albimi Laboratories, Brooklyn, N.Y.



Graph 1—Comparison of milk ring test results of Wisconsin with those of the two counties used for the survey.

RESULTS

In Calumet County, where 1,521 herds containing 33,447 cattle were blood tested, 22 (0.066%) reactor animals were found in 15 (0.99%) of the herds. Of the 15 herds which contained blood test reactors, seven had previously shown suspicious ring test reactions; one beef herd had not been ring tested; and seven, all of which contained only a single reactor, had shown negative ring tests. The blood test reactors in four of the seven herds negative to the ring test were not in production at the time of the ring test. In this county, there were 73 herds positive to the ring test. Of these herds, 66 did not contain animals with diagnostically significant sero-agglutination titers.

In Oconto County, 2,094 herds containing 40,608 animals were blood tested and 64

TABLE 2—Results of Ring Tests and Bacteriological Studies on Sero-Agglutination Suspicious Cattle

Ring test ratings	No. of herds	No. of cows	Culture positive herds	Culture positive cows
—	13	18	1	1
2+	1	1	0	0
3+	3	4	1	1
4+	11	18	4	5
Totals	28	41	6	7

(0.157%) reactor animals were found in 39 (1.8%) of the herds. Of the 39 herds with reactors, 23 had shown suspicious ring test reactions, two herds had not been ring tested, and 14 herds containing only 1 reactor each had shown negative ring tests. The reactors in six of the 14 herds which

TABLE 3—Comparison of Ring Test, Whey Test, and Cultures Made on Reactors to the Sero-Agglutination Test

No. of cows	Ring test ratings of the herds				Whey test	Culture
	—	2+	3+	4+		
13	6	1	2	4	Negative	Negative
1	1	0	0	0	Negative	Positive
3	2	0	0	1	Suspicious	Negative
2	0	0	1	1	Suspicious	Positive
16	4	1	4	7	Positive	Negative
26	1	0	5	20	Positive	Positive
Totals 61	14	2	12	33		

were negative to the ring test were nonlactating cows; another herd contained a cow nearing the end of lactation and which had been vaccinated as an adult. In this county, there were 236 herds positive to the ring test, of which 193 did not contain animals with diagnostically significant sero-agglutination titers.

In the two counties, a total of 41 sero-agglutination reactor herds (containing 62 reactors) and 28 sero-agglutination suspect herds (containing 41 suspects) were examined bacteriologically. *Brucella abortus* was recovered from 29 of the 62 reactors in 19 of the 41 herds (table 1). In the suspect groups, 7 of the 41 cows from 6 of the 28 herds were also infected (table 2).

The suspects used in this investigation were animals whose sero-agglutination titers were only one half dilution below the reactor titer level. Of the 41 suspects so examined, 32 were from herds which also contained 1 or more reactors. Four of the 7 suspects from which *Brucella* was cultured were from herds containing reactors which were also positive on culture.

In the APA tests, agglutination was inhibited at pH 4.0 with the 1:25 dilution of serum of 1 reactor and at pH 3.7 with the serum of 4 reactors. One of this latter group was positive on culture. The serums of 4 animals were inhibited at pH 3.4. The agglutination reactions of the remaining 52 reactors were not affected by the APA test. The 9 cows whose serums were affected by the APA test were all from ring test negative herds.

Of the suspect serums tested with the APA test, the reactions of eight were inhibited at pH 4.0, of three at pH 3.7, and of four at pH 3.4. One of the last group was positive on culture. Of the 15 cows whose serums were affected by the APA test in the suspect group, 10 were from ring test negative herds and 5 from herds showing 4+

TABLE 4—Comparison of Ring Test, Whey Test, and Cultures Made on Suspects to the Sero-Agglutination Test

No. of cows	Ring test ratings of the herds				Whey test	Culture
	—	2+	3+	4+		
26	15	1	2	8	Negative	Negative
1	1	0	0	0	Negative	Positive
1	0	0	1	0	Suspicious	Negative
0	0	0	0	0	Suspicious	Positive
7	2	0	0	5	Positive	Negative
6	0	0	1	5	Positive	Positive
Totals 41	18	1	4	18		

reactions to the ring test, but which also had 1 or more reactors in the herd.

The whey test was conducted on 61 reactors and 41 suspects. Of the 61 reactors (table 3), 14 were negative to the whey test, but 1 of these was positive on culture; 5 were suspicious to the whey test, but 2 were positive on culture; and 42 were positive to the whey test with 26 of them positive on culture.

Of the 41 suspect animals (table 4), 27 were negative to the whey test, but 1 was positive on culture; 1 was suspicious to the whey test, but was negative on culture; and 13 were positive to the whey test and 6 of these were positive on culture.

DISCUSSION

In doing a complete county blood test within three to four weeks following the county ring test, it was believed that the accuracy of the ring test could be evaluated. In Calumet County, the ring test successfully located seven of the 15 herds which contained reactors. Of the remaining eight, one was a beef herd and was not ring tested, and the reactors of four other herds were not in production at the time of the ring test. It is presumed that these herds would be disclosed on the next ring test. Thus, only three herds which contained only 1 blood test reactor each could be considered falsely negative to the ring test. The 3 reactor cows were examined and it was found that all 3 were negative on culture and 2 were negative to the whey test.

In Oconto County, 23 of the 39 herds with reactors were located by the ring test. Of the remaining 16, 2 herds were not ring tested, the reactors in seven were not in production at the time of the ring test, and 7 herds which contained 1 reactor each could be classified as falsely negative to the ring test. Six of these 7 cows were nega-

tive on culture and 4 were negative to the whey test.

Of the 3,615 herds in the two counties, the ring test missed only one herd which contained a lone lactating reactor which proved to be a shedder, and this animal was negative to the whey test. Nine additional cows in production in nine ring test negative herds did not yield *Brucella* organisms when the milk was cultured. Although it is not possible to conclude that these animals were incapable of spreading infection on the basis of a single attempt at isolation of *Brucella*, we have isolated *Brucella* from 58 per cent of reactors from ring test positive herds using these same methods.⁵

In Calumet County, with 1,521 herds, it cost \$1014.00 to locate, by means of the county-wide blood test, each herd which contained reactors. Using the milk ring test as a screening method, it cost \$104.28 to locate each herd which contained reactors.

The cost of locating a herd containing reactors in Oconto County was \$536.92 with the area blood test and only \$102.60 with the ring test.

In view of the high order of efficiency of the ring test in disclosing infection as shown in the present investigation, it is difficult to justify the great expense of periodic area-wide blood testing to maintain certification of areas. It is obvious, however, that the blood test must still be used in all ring test suspicious herds and non-ring tested herds in such areas. The same considerations would seem to apply in achieving complete eradication of infection.

SUMMARY AND CONCLUSION

1) A critical study was conducted in two Wisconsin counties to determine the efficiency of the milk ring test in establishing and maintaining modified-certified brucellosis-free areas.

2) In comparison with the standard brucellosis plate agglutination test, the whey test failed to identify 19 reactors, 3 of which were found to have *Brucella* infections of the udder.

3) In this study, antigens acidified to pH 4.0 did not inhibit sero-agglutination test reactions in the 36 reactor and suspect animals from which *Brucella* was isolated. At pH 3.4, the acidified plate antigen test inhibited the sero-agglutination test reactions of 2 animals in the same group.

4) Under the conditions of this investi-

gation, it was found that the use of the milk ring test on a semiannual basis was a highly efficient procedure for reducing the incidence of bovine brucellosis.

5) In the two Wisconsin counties studied, it was shown that area certifications can be effectively established and maintained by limiting blood testing to ring suspicious herds and herds not covered by the ring test.

References

- ¹Cameron, H. S.: The Interpretation of Whey Titers in the Diagnosis of Brucellosis. J.A.V.M.A., 129, (Dec. 15, 1956): 581-583.
- ²Cameron, H. S., Kendrick, J. W., and Merriman, R. W.: A Whey-Plate Test for the Diagnosis of Bovine Brucellosis. J.A.V.M.A., 129, (July 1, 1956): 19-22.
- ³Feja, E.: Die Abortus-Bang-Ringprobe in statischen Anerkennungsverfahren für brucellosefreien Rinderbestand. Berl. u. Münch. tierärztl. Wchenschr., 70, (1957): 69-70.
- ⁴Fleischhauer, G.: Die Abortus-Bang-Ringprobe (ABR), zur Feststellung von bangverdächtigen Vollmilchproben. Berl. tierärztl. Wchenschr., 53, (1937): 527-528.
- ⁵Janney, G. C.: An Evaluation of Diagnostic Methods for Bovine Brucellosis in Field Herds. Masters Thesis, University of Wisconsin, 1958.
- ⁶Kuzdas, C. D., and Morse, E. V.: A Selective Medium for the Isolation of *Brucellae* from Contaminated Material. J. Bact., 66, (1953): 502-504.
- ⁷Roepke, M. H., Paterson, K., Driver, F. C., Clausen, L. B., Olson, L., and Wentworth, J. E.: The *Brucella* Abortus Ring Test. Am. J. Vet. Res., 11, (1950): 199-205.
- ⁸Roepke, M. H., Stiles, F. C., Jr., and Driver, F. C.: The Efficacy of the *Brucellosis* Ring Test in Certifying Areas. J.A.V.M.A., 133, (July 15, 1958): 93-96.
- ⁹Rose, J., and Roepke, M. H.: An Acidified Antigen for Detection of Nonspecific Reactions in the Plate Agglutination Test for Bovine Brucellosis. Am. J. Vet. Res., 18, (1957): 550-555.

Johne's Disease—Complement-Fixation vs. Intradermal Tests.—In four years, 1,472 cattle imported from overseas to Canada were tested for *Johne's* disease by both complement-fixation and intradermal methods. Only 6 (0.04%) reacted to the former, 96 (6.5) per cent to the latter test. Possible explanations include: (1) skin sensitivity to johnin is usually demonstrated earlier than circulating antibodies; (2) animals sensitized to certain other acid-fast bacilli, notably avian tubercle bacilli, may show skin sensitivity to johnin; (3) the complement-fixation test may not be sufficiently sensitive to detect small amounts of circulating antibody.—C. E. Rice et al. in *Canad. J. Comp. Med.* (Aug., 1958): 289.

Epidemiological Studies on Psittacosis in Allegheny County

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PSITTACOSIS HAS been of relatively small public health importance in Allegheny County since 1934, when 11 diagnosed cases in man, with four deaths, occurred. The source was traced to a store selling psittacine birds. From 1947 to 1956, only 3 cases, with one death, were reported but, in 1957, there were 10 cases. This coincided with removal in Pittsburgh in January, 1957, of the ban placed on the sale of psittacine birds since 1934, and with a marked increase in the importation and sale of these birds in the area.

The decision to remove the restriction was based on the following considerations:

(1) Many birds were brought into the city from areas where there were no restrictions on their sale.

(2) Psittacosis virus had been found naturally distributed in many other types of birds and mammals.^{4,10}

(3) The effectiveness of antibiotics in treating psittacosis had reduced its relative importance as a health problem (the U.S. case fatality rate had dropped from nearly 20% in 1930 to less than 1% in 1956¹).

The number of cases reported in man throughout the United States had increased from 25 in 1951^{1,10} to 135 in 1952, and 262 in 1957.² Of the 808 cases investigated in the United States between 1952 and 1956, 444 (55%) were found to be of psittacine origin. The most important nonpsittacine source was turkeys.¹ These figures are probably underestimates, as many cases are not reported and some are mistakenly diagnosed and reported as virus pneumonia or influenza.^{1,3}

The Pennsylvania State regulations require that bird dealers keep a record of all sales and purchases of psittacine birds and report the death or illness of any bird in their possession to the public health authorities.¹² These birds are then collected for psittacosis virus isolation studies.

From the Allegheny County Health Department (Clack and Reidbord), and the Graduate School of Public Health, University of Pittsburgh, Pittsburgh, Pa. (Gezon).

The authors thank Drs. C. C. Wunderlich and D. Brobst and Mr. Jack Greenberg for their assistance in the field investigations, and Mr. Joseph Sarrandria for technical assistance in the serological studies.

The studies reported here were made: (1) to gain epidemiological information, through field investigations, of all reported psittacosis cases in man for 1957; (2) to measure the prevalence of infection among commercial bird handlers by means of a serological survey; and (3) to determine whether or not psittacosis virus is commonly found in psittacine birds which die in commercial bird handling establishments.

MATERIALS AND METHODS

Source of Serums.—Serum specimens were obtained from: (1) patients on whom a diagnosis of psittacosis was reported or suspected, and (2) sales personnel having contact with psittacine birds. Acute phase serum was obtained from most patients within the first ten days of illness and convalescent phase serum approximately ten days later. Single specimens of serum were obtained from sales personnel. All serums were stored at -10 C. until tested. Pairs were tested simultaneously and single specimens in large groups with suitable positive and negative controls.

Complement-Fixation Test.—A modification of the standard Kolmer technique was used to detect antibodies against psittacosis virus. Markham human pneumonitis psittacosis antigen was used. Serums were inactivated at 56 C. for 1/2 hour after initial dilution to 1:8. Twofold serial dilutions were made up to 1:320. Two tenths milliliters of antigen containing 2 units and 0.2 ml. of guinea pig complement containing 2 exact units were added and the tubes incubated at 37.5 C. for one hour and 15 minutes; 0.4 ml. of 2 per cent sheep red blood cells sensitized with 2 units of rabbit hemolysin was then added to each tube. The results were read after incubation for 20 minutes at 37.5 C.

Virus Isolations.—The birds collected for virus isolation studies were sent to the laboratory* for testing.

Field Investigations.—Field investigations were made by veterinarians of the Allegheny County Health Department after notification by a family that they had a bird which had died or was sick. In most instances, these birds were parakeets, recently purchased, which exhibited a greenish diarrhea, dyspnea, puffed-up appear-

*Through the Pennsylvania Department of Health, Virus Diagnostic Laboratory, Philadelphia, to the School of Veterinary Medicine, University of Pennsylvania, Philadelphia.

ance, and anorexia. In these investigations, when a history of illness in a member of the family was obtained, they were advised to contact a physician for diagnostic study and for treatment. The birds were collected and submitted to the laboratory for psittacosis virus isolation. The results were reported to the family physician.

Other investigations were conducted when clinical and serological information was reported by a physician who suspected or diagnosed psittacosis in his patient. Birds were also collected for virus study from the homes of these individuals, and other possible sources of infection were considered.

The serological survey of sales people handling psittacine birds was prompted by the isolation of psittacosis virus from a high percentage of the dead birds collected from stores in this county. An epidemiological history and a single blood specimen were obtained from a representative sample of sales personnel who had been exposed directly to the birds, their feathers, or their droppings.

RESULTS

The epidemiological, clinical, and laboratory findings in ten persons with psitta-

cosis, in the county between Jan. 1 and Aug. 31, 1957, are shown (table 1). The diagnosis was based on: (1) a fourfold rise in antibody titer or (2) an elevated titer plus the isolation of a virus from the contact parakeet.

One of the patients who had been exposed to a parakeet from which no virus was isolated had a titer of 1:80 on both acute and convalescent phase serums, as well as an illness which resembled psittacosis. Eight of the ten patients, which included two children, had been hospitalized during their illness. Eight had been exposed to parakeets although the virus was isolated from only 4 of these birds. Five of the 8 parakeets had been acquired before the ban on their sale in Pittsburgh had been removed. In all of these patients, the disease responded promptly to antibiotic therapy.

Of the 214 birds collected from stores and private individuals for laboratory examination, psittacosis virus was isolated from 3 of 24 canaries and from 119 of 190 parakeets—an over-all infection rate of 57 per cent (table 2). The great majority of these birds had been shipped from a single commercial source.

TABLE 1—Clinical, Serological, and Epidemiological Data on Ten Patients with Psittacosis

Patient No.	Patient		Exposure	Symptoms and signs							Hospitalized	Date of onset (1957)	Day of illness specimens collected	Interval between specimens (days)	Titer
				Bird	Virus isolated	Chills	Fever	Cough	Malaise	Dyspnea	Pneumonitis				
1	44	M	Parakeet	...	+	+	...	+	...	+	Yes	1/18	10	10	1:5
2	40	F	Parakeet	...	+	+	...	+	...	+	Yes	1/18	20	10	1:40
3	37	F	Parakeet	+	...	...	+	...	...	+	No	3/1	20	7	1:320
4	...	F	Unknown*	...	...	...	...	...	...	+	Yes	Unknown*	21	Unknown	1:80
5	3	M	None	...	...	+	+	...	...	+	Yes	4/10	1	10	1:160
6	8	M	Parakeet	+	...	+	+	...	...	+	Yes	4/13	10	5	1:5
7	35	F	Parakeet	+	...	+	+	...	...	...	No	4/14	9	6	1:10
8	57	M	Parakeet	+	+	+	...	...	...	+	Yes	5/25	9	9	1:40
9	26	F	Parakeet	...	+	+	...	+	...	+	Yes	6/4	19	7	1:80
10	52	F	Parakeet	Not attempted	...	+	...	...	...	+	Yes	8/10	17	7	1:80
													11	4	1:16
															1:128

*Patient not available for interview.

TABLE 2—Frequency of Psittacosis Virus Isolations from Sick or Dead Birds

Source	Total	Positive	
	No. examined	(No.)	(%)
Homes	39	20	51
Stores	175	102	58
Total	214	122	57

In the serological survey of 48 sales personnel from 13 different stores selling parakeets (table 3), 26 persons (54%) had psittacosis antibody titers of 1:5 or greater, and seven (15%) had 1:40 or greater. Many of the persons tested complained of recent respiratory illness ranging from slight to severe "colds," but only

TABLE 3—Frequency of Psittacosis Complement-Fixation Antibodies Among Commercial Bird Handlers

Store	No. of bird handlers	Psittacosis C.-F. antibodies		
		Negative <1:5	Low titer 1:5-1:20	High titer 1:40-1:320
A	1	—	—	1
B	6	4	2	—
C	4	1	3	—
D	9	4	2	3
E	3	2	1	—
F	8	4	4	—
G	3	3	—	—
H	4	3	1	—
I	2	—	—	2
J	2	—	1	1
K	3	1	2	—
L	2	—	2	—
M	1	—	1	—
Totals	48	22 (46%)	19 (39%)	7 (15%)

three had consulted their family physicians and none had been hospitalized.

In this survey, a titer of 1:40 or above was classified as high. A serum sample of 1:32 or higher is considered significant in the diagnosis of psittacosis if no acute serum samples are available.⁹

A comparison between the frequency of elevated antibody titers in sales personnel and the duration of exposure is shown (table 4). The percentage of those with high titers increased with the length of the exposure period.

DISCUSSION

From these studies, it would appear that, at present, parakeets constitute the most important source of reported psittacosis infections in man in this area. Eight of the ten patients had definite histories of contact with parakeets and, in 4 of these cases, psittacosis virus was actually isolated from the suspect parakeets. One of the ten patients, whose antibody titer increased from 1:5 to 1:160 in nine days, had definite clinical and serological evidence of the disease but denied any contact with birds. There may have been some casual contact with birds, their feathers, or droppings which the patient failed to remember.

The apparently increased incidence of psittacosis in man in this area is not surprising when the results of the virus isolation studies on the 214 birds are considered. The infection is latent in many apparently healthy birds.¹¹ Since the majority of the birds submitted to the laboratory were either ill or had died, the presence of psittacosis virus in 57 per cent is likely a gross overestimate of the prevalence of infection in the psittacine population in this area.

The degree of exposure of store personnel to the birds is difficult to determine; some had much greater exposure than others. For example, parakeets arrived at the store in containers usually holding 50 birds, with one opening for their removal. Thus, it was necessary to place the entire arm in the box and at the same time look through the small opening to see the birds, resulting in an extremely high degree of exposure to the attendant from dust and feathers in the box.

In the smaller stores, taking care of the cages and selling the birds were the tasks of any sales person who was near the counter or was assigned on a rotational basis, thereby increasing the total number of persons exposed. In the larger stores, the maintenance and sale of the birds was

TABLE 4—Frequency of Elevated Psittacosis Complement-Fixation Antibody Titers in Bird Handlers with Varying Duration of Exposure to Birds

Duration of exposure	No. of bird handlers	Titers					
		Negative		Low 1:5-1:20		High 1:40-1:320	
		(No.)	(%)	(No.)	(%)	(No.)	(%)
0-3 mo.	5	3	60	2	40	0	0
3-6 mo.	33	16	48	12	37	5	15
>6 mo.	10	5	50	5	50	2	20
Total	48	22		19		7	

the full-time duty of regularly assigned individuals. Some workers were exposed to hundreds of parakeets during the course of a week.

The data in table 4 would seem to indicate that the longer the duration of exposure to the birds the greater the likelihood of development of an elevated antibody titer to psittacosis. These antibodies are reported to persist over long periods of time only when repeated antigenic stimulation takes place.³

It would appear that there is need for an improved method of controlling psittacosis in this area. Strict regulations aimed at controlling the traffic of psittacine birds are not effective; they are costly and unenforceable. Certainly with the large pet bird population, it would be impossible to remove the main reservoir of infection.

Recently, the use of chemotherapy or chemoprophylaxis has been advocated for all parakeets before they are offered for sale.⁷ The intramuscular injection of tetracycline has reduced infection rate to a minimum and, in many instances, abolished the carrier state.^{5,6,8} In several field trials, the feeding of tetracycline compounds to large numbers of birds in which infection was known to be present was found effective (98%) in controlling the infection.^{5,7,8} This antibiotic millet seed feed preparation should be commercially available in the near future.

SUMMARY

1) The clinical, serological, and epidemiological findings on ten patients with psittacosis are presented.

2) Presumptive evidence was obtained that the sources of infection in eight of the ten was parakeets. Psittacosis virus was isolated from 4 of the 8 birds involved.

3) Virus isolations were made in 57 per cent of 214 birds which had been collected because they were ill or had died.

4) Antibodies for psittacosis were present in 26 (54%) of the blood specimens from 48 sales personnel who handled pet birds. Of these, 7 (15%) had high and 19 (39%) had low titers. High titers were correlated with long exposure.

5) Methods for controlling this disease are discussed.

References

¹Andrews, J. M.: Psittacosis in the United States. J.A.V.M.A., 130, (Feb. 1, 1957): 109-115.

²Anon.: Morbidity and Mortality. Weekly Report, U.S. Department of Health, Education, and Welfare. Annual Supplement, 5, (1956): 53.

³Fagan, R.: Psittacosis and Other Virus Diseases. Address delivered at Pennsylvania's Third Annual Health Conference, Pennsylvania State University, University Park, Aug. 18, 1954.

⁴Meyer, K. F.: Psittacosis (Ornithosis). In "Diseases of Poultry," edited by H. E. Biester and L. H. Schwarte. 3rd ed. Iowa State College Press, Ames, Iowa (1952): 569-618.

⁵Meyer, K. F.: Problems in the Control of Psittacosis and Ornithosis. Proc. Book, AVMA (1955): 412-419.

⁶Meyer, K. F.: Chemotherapy as a Means to Control Psittacosis. In "Progress in Psittacosis Research and Control," edited by F. R. Beaudette. 2nd ed. Rutgers Univ. Press, New Brunswick, N. J.: To be published.

⁷Meyer, K. F., George Williams Hooper Foundation for Medical Research, University of California, San Francisco: Personal communication, 1957.

⁸Meyer, K. F., and Eddie, B.: Chemotherapy of Natural Psittacosis and Ornithosis Field Trial of Tetracycline, Chlorotetracycline and Oxytetracycline. Antibiot. and Chemo., 5, (1955): 289-299.

⁹Rake, G.: The Diagnosis of Psittacosis. In "Psittacosis," edited by F. R. Beaudette, Rutgers University Press, New Brunswick, N.J., 1955.

¹⁰Steele, J. H.: Psittacosis: Veterinary Public Health. In "Advances in Veterinary Science," 1, edited by C. A. Brantly and E. W. Junghurs, Academic Press, Inc., New York (1953): 349-352.

¹¹Shaughnessy, H. J.: Psittacosis. In "Diseases Transmitted from Animals to Man," 4th ed. Edited by T. G. Hull. Charles C Thomas, Springfield, Ill. (1955): 281-303.

¹²Witte, E. J.: Psittacosis—State Problems. Proc. Conf. Pub. Health Vet. (1953): 136-139.

Effective Vaccines for Fowl Cholera

Since Pasteur succeeded in protecting chickens against fowl cholera by vaccination, attempts to duplicate his success have failed. Five new types of vaccine, made of killed *Pasteurella multocida*, and one commercial vaccine were recently tested. A single dose of water-in-oil emulsified vaccine protected a high percentage of chickens effectively for nine months. An ethylene oxide-killed aqueous vaccine gave protection to some birds for six months, but more birds were protected for that period when the dose was repeated in two or eight weeks.

An emulsified cell-free "capsular" vaccine also protected most birds for six months. The alum-precipitated vaccine, the chicken embryo vaccine, and the commercial vaccine were of little value. The chickens vaccinated with the commercial vaccine had no more protection than the unvaccinated controls.—K. L. Heddleston and W. J. Hall in *Avian Dis.* (Aug., 1958): 322.

Fibrosarcoma of the Urinary Bladder in the Dog

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A. D. ALBRECHT, M.D.

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A FEMALE Basset Hound, 18 months old, with manifestation of hematuria and dysuria was referred* to the University of Illinois veterinary clinic on Oct. 2, 1957, with a tentative diagnosis of interstitial cystitis and a cystic neoplasm.

On examination, a mass approximately 4 by 4 cm. was palpated in the region of the

ture. The urine had the following characteristics: specific gravity, 1.022; reaction, pH 6.8; protein, large amount; cellular material, abundant.

Preparatory to radiographic studies, the abdominal cavity was inflated with oxygen and the bladder with air. The films revealed a large mass in the bladder and a

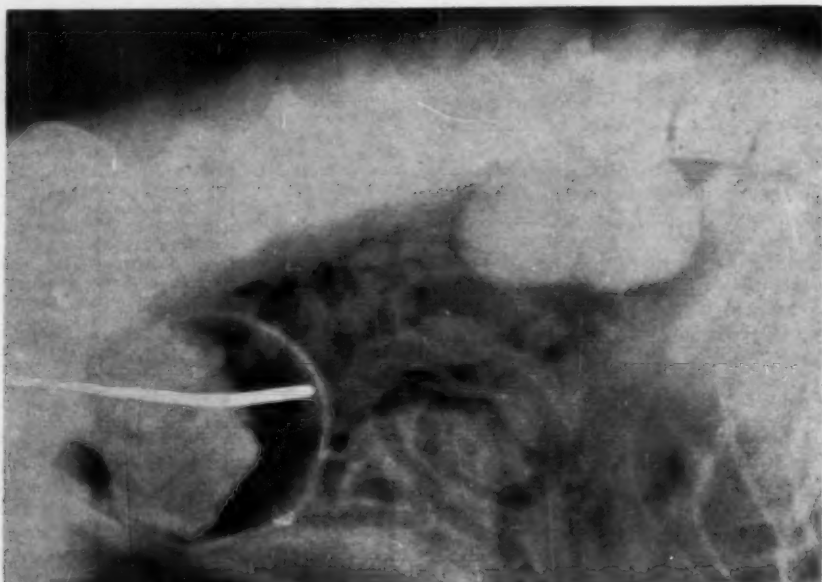


Fig. 1—Radiograph showing a tumor in the bladder of a dog; a catheter has been inserted. Notice the enlarged kidneys.

bladder. The total leukocyte count was 60,000 per cubic millimeter, and non-protein-nitrogen was 46 mg. per 100 cc. of blood. It was difficult to insert a urinary catheter all the way into the bladder because the catheter struck a soft struc-

thickened bladder wall, confirming the diagnosis of interstitial cystitis and cystic neoplasm. Neoplastic involvement of the bladder sphincter was also suspected. The films further showed somewhat enlarged kidneys (fig. 1).

Permission was requested and granted for an exploratory laparotomy. In view of a possible cystectomy and a ureterorectal anastomosis, the dog was given sulfaguandine ($\frac{1}{2}$ gr. per pound of body wt.) for four days preceding surgery. The exploratory laparotomy revealed neoplastic in-

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The authors thank Mrs. Marion Watrach for preparation of sectioned material and photomicrographs, and Mrs. Helen Olson for assistance in the preparation of the illustrations.

*By the Riser Animal Hospital, Skokie, Ill.

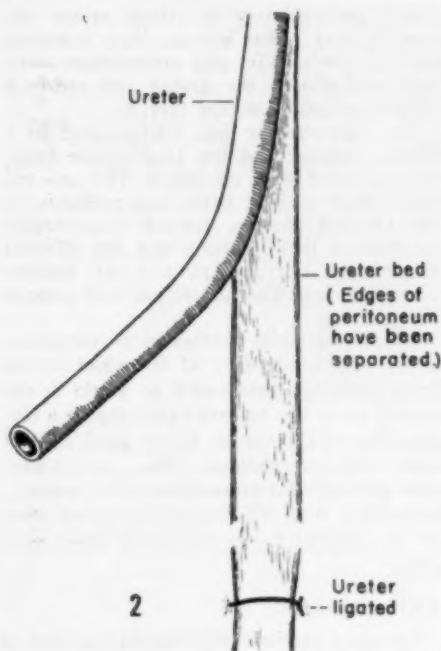


Fig. 2—An incision was made through the dorsal peritoneum on the medial side of the left ureter of the same dog shown in figure 1; the ureter was ligated, transected anterior to this ligature, and then undermined and elevated.

volvement of the major portion of the bladder, sphincter, and a portion of the urethra. A ureterorectal anastomosis seemed to offer the only chance for survival of the animal.

SURGICAL PROCEDURE

The operative procedure for the most part utilized a previously described technique.⁵ An incision was made through the dorsal peritoneum on the medial side of the left ureter. This incision began at the junction of the ureter and bladder and extended cephalad for approximately 8 cm. The ureter was ligated with 00 nylon at the ureterovesical junction, transected anterior to this ligature, and then undermined and elevated with the tissue immediately adjacent to it. Leaving the periureteral tissue attached to the ureter assured it of adequate blood supply and innervation⁷ (fig. 2).

The edges of the peritoneal incisions from which the ureter had been removed were next sutured (continuous) with 00

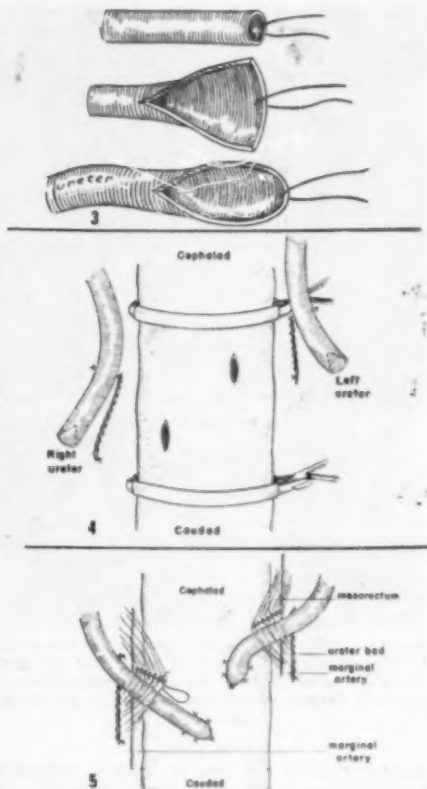


Fig. 3—The end of the exposed ureter was shaped in an oblique plane to allow elliptical attachment to the rectum of the dog.

Fig. 4—Drawing showing clamps on the rectum and points for anastomosis of the right and left ureters.

Fig. 5—Diagram of the rectum with ureters attached. Peritoneum and mesorectum have been folded over the ureters and retained with continuous sutures.

chromic catgut. A guide suture was placed through the distal end of the exposed ureter. With the guide suture held under tension, the end of the ureter was shaped in an oblique plane, thus producing a larger orifice for suturing (fig. 3).

The ureter was then brought to the rectum and a site selected for anastomosis in such a way that it would enter the rectum anteriorly to the right ureter, and without tension (fig. 4).

This section of the rectum was then clamped off with intestinal clamps to reduce peritoneal contamination and hemorrhage, and was isolated by placing warm, moist sponges around it. A longitudinal incision,

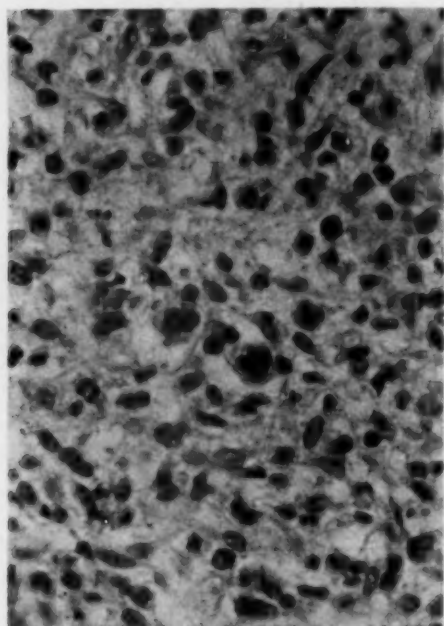


Fig. 6—Section from a fibrosarcoma of the urinary bladder of a dog. Two multinucleate cells are shown in the center of the field. The cellular components are relatively densely packed and variable in size. H & E stain; $\times 500$.

approximately 1.5 cm. in length, was then made through the wall of the rectum (fig. 4). Four interrupted (through and through) sutures were used to approximate the ureter with rectal mucosa, submucosa, and muscularis.

Two additional interrupted sutures were

placed appropriately to attach ureter adventitia and rectal serosa, thus reducing tension. Peritoneum and mesorectum were then folded over the ureter and retained with a continuous suture (fig. 5).

The right ureter was transplanted in a similar manner and the anastomotic areas were covered with omentum. The urethra was ligated with 00 nylon just posterior to the affected portion, incised transversely anterior to this ligature, and the affected portions of the urethra and the bladder were removed. The abdominal wall closure was routine.

There were no postsurgical complications. The consistency of the stool varied from normal to semiliquid, as would be expected when the rectum functions as a cloaca. The dog retained fairly good control over her evacuations. The nonprotein-nitrogen and the concentrations of sodium, potassium, and chloride in the blood were in the normal range one week after surgery.

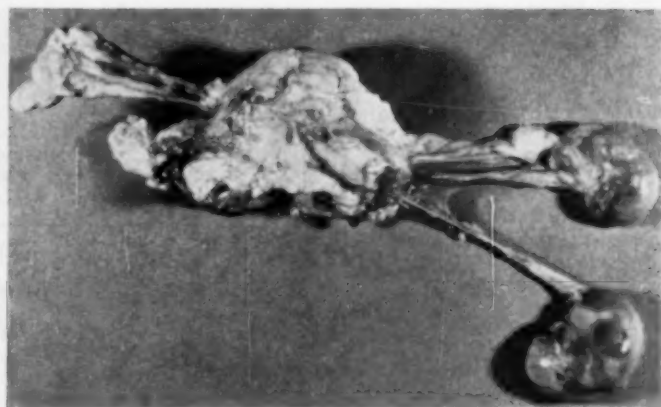
HISTOPATHOLOGY

The tissue examined histologically consisted of a section of tumor from the urinary bladder wall fixed with Zenker's fluid. The wall varied from three to six times the normal thickness. The serosal surface was smooth, but the epithelial surface was lobulated. Parts of the epithelium were eroded, exposing underlying tissue which was a densely packed mass of mesenchymal cells and foci of inflammatory cells. The mesenchymal cells were round to spindle-shaped. They possessed a prominent nucleus, one or more nucleoli, and relatively scanty, pale eosinophilic cytoplasm (fig. 6). A few multinucleate cells were present (fig. 6), and mitotic figures were abundant.



Fig. 7—Radiograph showing recurrence of the neoplasm of the same dog shown in figure 1.

Fig. 8—Necropsy specimen showing the neoplastic mass which originated from the urethral stump in a dog.



Toward the serosal surface the cellular pattern was less dense and collagen was relatively more abundant. Muscle fibers could not be identified in the section examined. On the basis of diffuse infiltration of the bladder wall and urethra, together with a relatively high degree of anaplasia and development of collagen, the structure was classified as a fibrosarcoma.

POSTOPERATIVE HISTORY

The prognosis was guarded because of the possibility of recurrence of the neoplasm and metastasis. Ureter dilatation, ascending infections, and hydronephrosis are also common sequelae.

Approximately nine months after the operation, the dog began to show inappetence and gross emaciation but maintained good control over her evacuations.

A large mass (fig. 7) could be palpated in the region of the stump of the urethra and a recurrence of the malignancy with accompanying metastasis was suspected. An exploratory operation was undertaken but the patient died before anesthesia could be completed.

Necropsy revealed a mass approximately 5 by 10 cm. which originated from the urethral stump (fig. 8). Both ureters were normal in size. There was no macroscopic evidence of mucosal deterioration from urine contact, and the ureterorectal orifices were patent (fig. 9).

On microscopic examination, the wall of the rectum at the site of ureteral insertions was about twice normal thickness. A moderate chronic inflammatory reaction in this area was evidenced by the presence of mononuclear infiltration and collagen deposition. The right kidney was reduced in

size, the cortical area was diminished, but the pelvis was dilated. Metastasis had occurred to the regional lymph nodes and to the liver. The lesions in the liver were circular (approximately 2 cm. in diameter) and greenish yellow.

Histologically, the mass removed from the urethral stump was a neoplasm similar in cell-type and architecture to that found in the bladder. The liver metastases presented a similar histological appearance.

DISCUSSION

The urinary bladder of the dog is considered a relatively common site of neoplasms. They are usually epithelial in origin, with mesenchymal tumors occurring

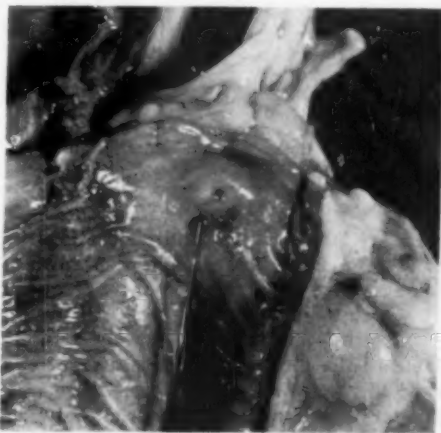


Fig. 9—Probe points to patent ureterorectal orifice in the neoplastic mass shown in figure 8.

less frequently. Reports of fibrosarcoma in the urinary bladder of the dog are rare.²

Sarcomas of the urinary bladder have been described^{3,4} but the tumors were not identified as to cell of origin. A fibrosarcoma in the urinary bladder of a 3-year-old dog was recently observed.¹ All three of these reports describe widespread metastases which resulted in death.

An inoperable sarcoma involving the neck of the bladder in a 1-year-old Springer Spaniel has also been reported.⁵

SUMMARY

A dog with extensive neoplastic involvement of the bladder and a portion of the urethra was treated by cystectomy and partial urethrectomy, followed by ureterorectal anastomosis.

Approximately nine months later, the neoplasm, a fibrosarcoma, recurred with metastasis to the liver and the regional lymph nodes.

References

- ¹Brand, M.: A Case of Fibrosarcoma of the Urinary Bladder of the Dog. *M.S.U. Vet.*, 17, (1958): 185.
- ²Cotchin, E.: Neoplasms of the Domestic Animals, A Review. Review Series No. 4 of the Commonwealth Bureau of Animal Health, Commonwealth Agricultural Bureau, Farnham Royal Bucks, England, 1956.
- ³Gassette, E.: Cancer de la Vessie chez une Jeune Chienne. *Rev. méd. vét.*, 75, (1923): 152-156.
- ⁴Labrun, P.: Le Cancer de la Vessie chez les Animaux Domestiques. Thesis, Lyons, 1938.
- ⁵Nesbit, Reid M.: Ureterosigmoid Anastomosis by Direct Elliptical Connection. *J. Urol.*, 61, (1949): 728-734.
- ⁶Schnelle, G. B.: Radiology in Small Animal Practice. North American Publications, Evanston, Ill. (1950): 309.
- ⁷Wolf, Monroe, et al.: Agnesis of the Female Urethra, Trigone, and the Anterior Anorectal Wall (A Congenital Anorectal Cloaca). *Am. J. Surg.*, 93, (1957): 1030-1033.

Fracture Management in the Aged.—A study of 500 fractures and dislocations in elderly people indicated that with advancing age these were relatively more frequent in women than in men.

There are no techniques especially applicable to the treatment of fractures of the aged but there are limitations. There is a greater need for a resting period between emergency care and definitive treatment;

manipulation or surgery is best performed after recovery from the shock of trauma. Other limitations are the relative softness or compressibility of the bones and the normally decreased elasticity of the muscular and periarticular connective tissues. Early and rapid mobilization of the part may cause excessive stretching of the tissues.—*J.A.M.M.A. (June 14, 1958): 908.*

Use of Spay Hook in Baby Pig Castration

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The castration of pigs at an early age is a widespread practice and is desirable because small pigs are easier to handle, wound infection is negligible, and interruption of growth rate is held to a minimum.

The technique of using a spay hook as described in this paper is an improvement over the conventional methods of incising the scrotum or of using the finger to draw the cord and testicle through an inguinal incision.

The spay hook method has been used for two years to castrate approximately 500 pigs. They were castrated quickly; there was very little trauma; and the small, clean incisions healed rapidly. Wound contamination was insignificant and the instruments were easily dipped in a disinfectant solution between each operation, which helped prevent transmission of infection from one pig to another. Because of its smaller size, the Covault hook was more suitable for this operation than the Snook hook. To avoid cramping of the operator's fingers when many pigs were castrated at one time, the handle of the hook was enlarged by wrapping it with tape.

The operation was most easily performed on pigs between the ages of 4 and 7 days. In pigs younger than 4 days, the scrotal ligament had not developed enough to anchor the testicle in the scrotum. Consequently, when the pig was suspended by the hindlimbs, the testicle dropped down to the external inguinal ring and the spermatic

From the Department of Veterinary Science, Ohio Agricultural Experiment Station, Wooster.

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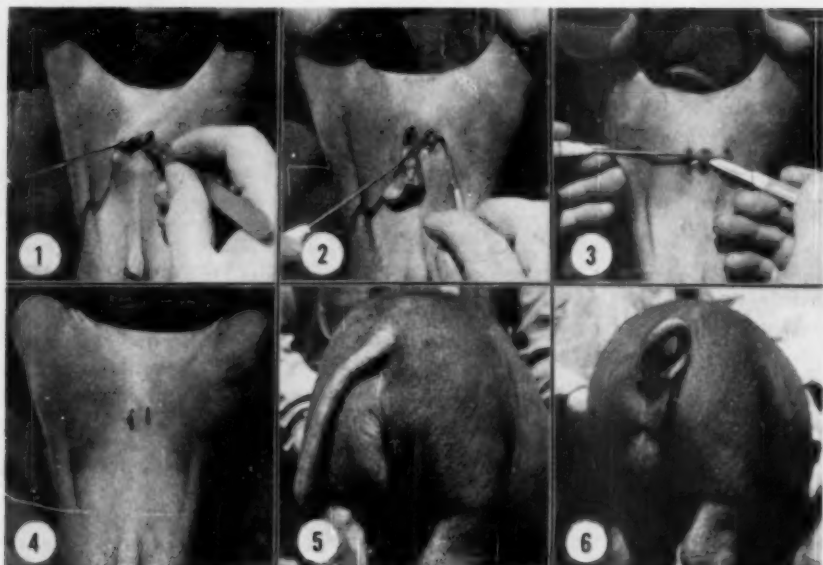


Fig. 1—In castrating a pig by use of the spay hook, a 4-day-old pig is suspended by the hindlimbs, and the skin, subcutaneous tissue, and tunica vaginalis communis are incised with a single stroke; then the spermatic cord is exposed.

Fig. 2—The left testicle is exposed and the right spermatic cord is drawn through the incision with the spay hook.

Fig. 3—The right spermatic cord is exposed and ready to be divided, leaving the testicle in the body.

Fig. 4—Small, clean wounds 72 hours after castration.

Fig. 5—Nine-week-old pig castrated at 5 days of age. The spermatic cords were severed and the testicles left in the body. No remnant of the testicles can be palpated; the inguinal incisions cannot be found and no unfavorable results have followed this procedure.

Fig. 6—Uncastrated male pig showing testicle development at 9 weeks of age. Compare this pig with the one shown in figure 5.

cord was more difficult to locate with the spay hook. In pigs older than 7 days, the scrotal ligament had developed enough to make rapid withdrawal of the testicle more difficult; however, the operation can be performed on older pigs.

OPERATIVE PROCEDURE

The operation is completed in the following steps (fig. 1-6):

1) A small gauze pad dipped in disinfectant is held in a pair of forceps which are lodged on the third and fourth fingers of the right hand throughout the entire operation. This is used to quickly disinfect the site of operation.

2) An assistant suspends the pig by the hindlimbs.

3) An incision, about 1 cm. in length, parallel with and close to the midline, and deep enough to penetrate the skin, subcutaneous fat, and the tunica vaginalis communis (fig. 1), is made with a single stroke. A sharp No. 12 Bard-Parker blade is preferred.

4) The spay hook is passed through the incision, under the spermatic cord, and quickly withdrawn, bringing with it the spermatic cord and testicle (fig. 2).

5) The operation is repeated on the opposite side. Then, both testicles are grasped, slight tension applied, and the cords cleanly cut at the edge of the incisions.

DISCUSSION AND CONCLUSION

In pigs of this age, the spermatic cords can be severed (fig. 3) and the testicles left

intact, with no risk of infection or undesirable results. However, this requires more time than removing the testicles.

When the operator is learning this technique, care should be used not to pick up the penis with the hook. Hernias and other abnormalities must be corrected in the usual manner. However, small hernias may be overlooked because of the small incision.

No complications have developed in hundreds of pigs that have been castrated by this method.

Fetal Mummification in Cattle

While the cause is not understood, bovine mummification usually occurs at four to six months of gestation, presumably due to hemorrhage which separates the maternal and fetal cotyledons. The fluids are absorbed and the fetus becomes dry, hard, shriveled, and brown. In four years, among approximately 10,000 cows (40,000 pregnancies), 23 cases were observed. Nine of the 23 were in heifers and, since they were not closely observed, others may have been culled for slaughter. An incidence of 1 in 2,000 pregnancies could be expected.

Mummification is suspected when the calving date is passed without signs of parturition or lactation and no signs of estrus. On rectal palpation, the uterus is atonic and thin-walled. The fetus is bony and angular, the arteries are small with a minimum pulsation, ovaries are usually small with firmly embedded corpora lutea, and no fetal membranes or cotyledons are palpable.

Of the 23 cases, 7 were found when dystocia occurred. Of the 16 in which the fetus was in the uterus, 4 of the animals were marketed without treatment, since future conception would be hampered. The first 2 heifers were treated with stilbestrol dipropionate (25 mg. intramuscularly) without success; 1 was marketed after one treatment, the other was killed due to infection which entered through the cervix which opened inadequately following six days of treatment.

The remaining 10 animals were treated with estradiol monobenzoate with encouraging results. The initial dose was 20 mg. or more, depending on the size of the fetus and the dilation required. Of the 10 treated, 7 cows expelled the fetus completely, 4 after a single injection (2 aided by traction), and 3 after two or three in-

jections (plus fetotomy). In 1 heifer, the cervix relaxed after two injections but the fetus was not expelled until after an intrauterine injection of 5 per cent Lugol's solution. In 2 cases, treatment failed; 1 cow was marketed after a single treatment, the other, a 30-month-old heifer bred 15 months previously, discharged uterine debris but the cervix would not permit passage of a finger after a 60-mg. dose. However, lactation started and this heifer produced 7 pints of milk daily.

One cow milked well after delivery of the fetus and in about six weeks she conceived and subsequently calved normally.—R. W. Gee in *Austral. Vet. J.* (Aug., 1958): 265.

Colostrum and Antibodies in the Infant.

—The human infant derives most of its initial immunity from antibodies which cross the placenta. However, antibody globulins are present in human colostrum.

Except for the incidence of measles, which was strikingly lower in breast-fed infants, no evidence has been found that antibodies present in either human or bovine colostrum are absorbed to a measurable extent by infants, even by premature infants who might be expected to absorb intact proteins more easily than full-term infants.—*Nutr. Rev.* (Sept., 1958): 261.

Estrogenic Activity of Soybean Forage.

—Reproductive failures have been reported in rabbits fed large amounts of soybean material. In an experiment at North Carolina State College, estrogenic activity was detected in an extract of green soybeans, in the early bloom stage, by means of the mouse uterine weight technique. The effect of the extract from 100 Gm. of the green forage was equivalent to 0.03 µg. of diethylstilbestrol.—*J. Anim. Sci.* (Aug., 1958): 787.

Early Castration of Brahma Cattle.—

In a study of the advantages of early or late castration of 80 Brahma cattle, there was little difference in the development and weight gain of those castrated when 2 to 5 days old or when 18 months old, but the simplicity and the low incidence of ill effects in the younger group makes this method more desirable.—C. E. Salles Gomez and H. M. Barros in *Cent. Acad. Med. Vet.* (Jan., 1958): 29.

Fibrous Dysplasia of the Bone in Swine

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DISEASES of the bone in animals are infrequently recognized and their differential diagnosis is usually difficult.

Fibrous dystrophia of the bone, osteodys-trophia fibrosa, osteitis fibrosa cystica, and fibrous dysplasia of the bone are synonyms, and may be confused with rickets or osteomalacia. Fibrous dysplasia of the bone in animals is generalized and corresponds to generalized osteitis fibrosa cystica in man.

Early descriptions of this disease in swine were made by French and German investigators. Many^{2,4,5,7,9,11,15,21,22,26,30} described the lesions in a single animal, whereas others^{3,20} described the disease in several or all animals of the same litter. In the majority of cases, the lesions were found in nearly all bones; however, the bones of the skull were more markedly affected with cysts. The cause was not established.

A few cases of fibrous dysplasia of the bone have been described in goats.^{5,10,16} The lesions were confined to bones of the skull, especially the mandible, and cysts were not observed. The disease has been seen in horses in many parts of the world,^{5,25} usually in the generalized form.

Dogs^{3,5,10,19,22,28,29} manifest the generalized form of this disorder, but the bones of the head and particularly of the jaw were markedly affected with cyst formation. The disease has not been reported in cattle although the possibility of confusion in diagnosis does exist.²⁰ The disease has also been observed in monkeys³ and baboons.⁶

HERD HISTORY AND PATHOLOGICAL FINDINGS

A farmer in southern Wisconsin inadvertently bred 8 spotted Poland China sows to a boar which was a brother of their

dams. Litters born between the middle of September and early October, 1956, were apparently normal until the middle of January, 1957, when the owner noticed abnormal development of the nose in some pigs from three litters.

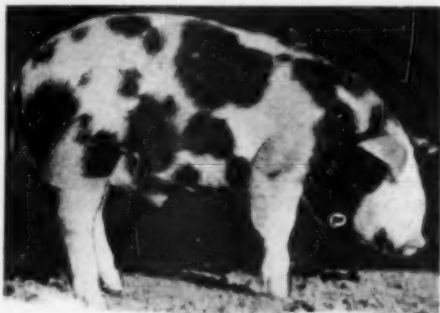


Fig. 1—Pig with fibrous dysplasia of the facial bones. Notice swelling extending from the snout to the level of the eyes.

The attending veterinarian found no evidence of infectious disease. Affected pigs had swelling of the dorsal part of the nose. They were slightly stunted, but were vigorous, had normal body temperatures, and good appetites. After the second examination two weeks later, when the deformation of the nasal bones was more pronounced, two of us (R.A.A. and E.D.B.) were called for consultation. After necropsy of the pig with the most advanced lesions, a diagnosis of osteitis fibrosa cystica was made.

By February 20, 11 of the 50 pigs in the herd were affected. They had dyspnea and some breathed with an open mouth, producing a slight snoring sound. In addition, their legs were stiff and the ends of the long bones and the joints were thickened. The most characteristic lesion was a swelling on the nose which extended from the snout to the level of the eyes (fig. 1). The swelling was soft, spongy in some areas but firm in others, and there was no local elevation in temperature.

All pigs were given the same commercial

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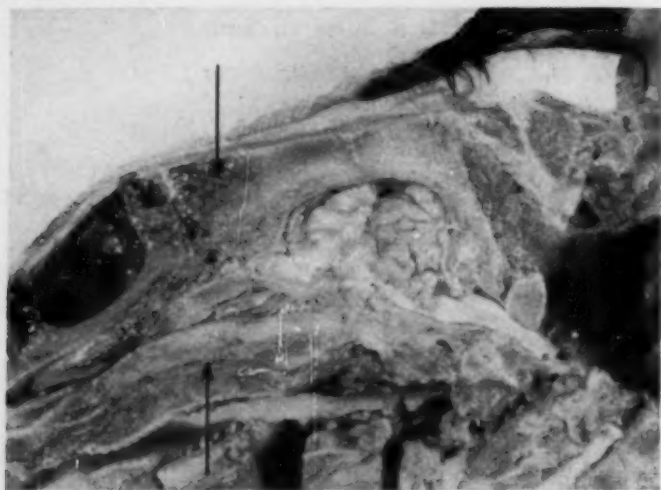


Fig. 2—Medial section of the head of the pig shown in figure 1; area of rarefaction (arrows).

feed mixture, which was considered adequate and properly balanced. No difficulty was reported from other farms using the same feed mixture.

Gross Pathology.—At necropsy, no abnormalities of the internal organs were found. The lesions were confined to the bones of the face and legs. The nasal bones were prominent and bulged smoothly both laterally and dorsally. They were so soft they could be easily cut with a knife, were

much thickened, and had a cavernous structure. The mandibular, maxillary, lacrimal, molar, palate, frontal, and temporal bones were also affected to varying degrees.

There were several cysts ranging up to 1 inch in diameter and filled with a clear pinkish fluid. The bone surrounding the cysts was spongy. The septa between the cysts varied in thickness and were red, as though rich in capillaries. Some cysts were near the skin. The normal structure of the

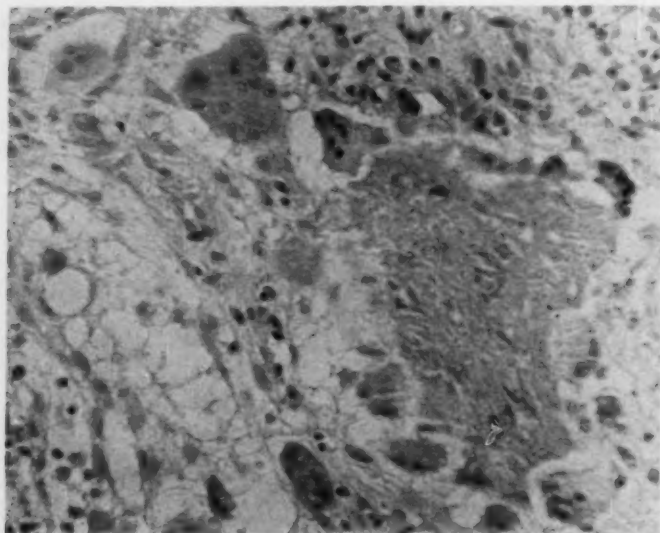


Fig. 3—Osteoclasts eroding an area of degenerative bone, with some fibrous connective tissue surrounding the bony area in a pig with fibrous dysplasia.
x 300.

affected bones was replaced by a thick trabecular, porous, spongy, honeycomb tissue (fig. 2) which contained an excess of fluid.

In some places, especially under the skin of affected areas and under the mucosa of the hard palate, there was a thick layer of pale red fibrous tissue. The turbinate bones were compressed by the abnormal bone and the nasal passages were markedly narrowed. The hard palate bulged slightly into the oral cavity. The molar and premolar teeth were slightly separated and the oral mucosa partly covered their crowns.

The epiphyses of the metacarpal and metatarsal bones, and of the radius, humerus, tibia, and femur were thickened and the periosteum of these regions was thickened and pale red.

Histopathology.—The affected nasal bone had an extensive proliferation of fibrous connective tissue which was replacing bone. Islands of bone tissue were surrounded by large, irregularly outlined, multinucleated osteoclasts (fig. 3). Areas of hemorrhage were prominent and accumulations of hemosiderin were found scattered throughout the connective tissue.

There was atrophy of the cartilaginous plates in the nasal septum near the cystic spaces with displacement of cartilage by a dense fibrous connective tissue (fig. 4, 5). In apposition with the tissue were extensive aggregations of an iron-containing compound, which were large, circumscribed, and scattered throughout.

There was a hyperplasia of the lymphoid elements in the submaxillary lymph nodes. The peripheral sinuses were infiltrated with eosinophils, and a proliferation of reticular tissue was present.

DISCUSSION

Fibrous dysplasia of bone in animals has occurred under various etiological circumstances and has been produced experimentally in various ways.^{8,13,14,23,29} Infectious, toxic, nutritional, genetic, and hormonal causes have been considered. Attempts to demonstrate an infectious or toxic agent have been unsuccessful in contact trials and subcutaneous injections of bone marrow.¹ The genetic, nutritional, and hormonal aspects were considered when the whole litter or part of it was involved.

Intake of calcium and phosphorus in a ratio of 1:2.9 or more induces this disorder

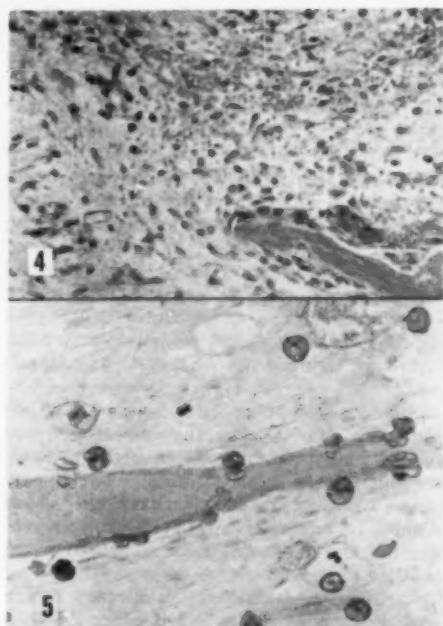


Fig. 4—Cartilaginous plates from the nasal septum of a pig with fibrous dysplasia. There is extensive fibrous connective tissue proliferation in proximity to bone undergoing lytic activity of osteoclasts; within connective tissue stroma is an area of hemorrhage. $\times 200$.

Fig. 5—Degenerative cartilaginous plate from nasal septum of pig with fibrous dysplasia of bone. This area of cartilage was in contact with a serosanguineous cyst containing spherical iron with pigment masses. $\times 200$.

in horses, whereas it does not occur with a ratio of 1:1.9 or less.¹⁴ Using the same low calcium and high phosphorus ratio, similar results were obtained in horses^{6,25} and in dogs.²⁹ Prolonged injections of parathyroid hormone into dogs and guinea pigs with either low or high calcium intake produced this disease.¹³

It has been suggested^{19,23} that secondary hyperparathyroidism in dogs can develop in the course of chronic interstitial nephritis in which tubular and glomerular damage may result in phosphate retention and acidosis.

The intake of low calcium and a wide $\text{CaO:P}_2\text{O}_5$ ratio does not produce this disease in cattle, and fibrous dysplasia, produced either naturally or experimentally, has not been described in cattle.^{25,27}

Only the incipient stage of this disease

occurred in a pig on a low calcium, high phosphorus diet.²⁰

Normal mineral metabolism was reported to depend upon an harmonious interaction of vitamins, calcium, and phosphorus.²⁵ However, there may be species and individual differences in the interaction between these nutrients. Concomitant endocrine dysfunction can be involved in the development of lesions of fibrous dysplasia of bone with or without dietary deficiency.²⁵

In man, neoplasia or hypertrophy of parathyroid glands may result in primary hyperparathyroidism and cause the changes in the skeleton described under the name of osteitis fibrosa cystica generalisata.¹

Secondary hyperparathyroidism is observed in man during the course of renal insufficiency, which leads to phosphate retention and acidosis. Subsequently, hyperplasia of the parathyroids develops, which results in an excess of parathormone production and development of so-called "renal osteitis fibrosa cystica."

In the case described, the dietary factor was presumably not involved, since the feed originated from a reputable feed company and was properly balanced. Furthermore, if the nutritional factor were the sole cause, more litters in the neighborhood should have shown these lesions.

Since there was a definite history of inbreeding, it is suspected that genetic factors contributed to the development of this disease. Later, the same sows were bred to a boar not related to them and they produced normal pigs. This seems to emphasize the role of a genetic factor in the pig.

SUMMARY

Fibrous dysplasia of bones occurred in inbred pigs in three litters. Genetic factors appeared to be involved.

References

- ¹Anderson, W. A. D.: Pathology. C. V. Mosby Co., St. Louis (1953): 1211.
- ²Basset: Anatomie Pathologique de L'Osteomalacie Spontanée et Expérimentale (quoted by Christeller). Arch. Méd. Expér. et Anat. Path., 1, Série 18A, 1906.
- ³Brodey, R. S.: Renal Osteitis Fibrosa Cystica in a Wire-Haired Fox Terrier. J.A.V.M.A., 124, (April, 1954): 275.
- ⁴Busolt: Schnüffelkrankheit der Schweine (quoted by Christeller). Inaug.-Diss., Giessen, 1913.
- ⁵Christeller, E.: Die Formen der Ostitis Fibrosa und der verwandten Knochenerkrankungen der Säugetiere. Lubarsch-Ostertaag. Ergebn. d. allgem. Pathol. u. pathol. Anat. Bd. 20, 2.Abt. 1 T., 1, 1923.
- ⁶Cordy, D. R.: Osteodystrophia Fibrosa Accompanied by Visceral Accumulation of Lead. Cornell Vet., 47, (1957): 480.
- ⁷Friederich: Rachitische Veränderungen am Kopfe eines Schweines (quoted by Christeller). Berl. tierärztl. Wchnschr., 43, 1903.
- ⁸Groenewald, J. W.: Bone Diseases in Equines. Onderstepoort J. Vet. Sci. and Anim. Indust., 9, (1937): 601.
- ⁹Haubold, B.: Schnüffelkrankheit bei Schweinen Sachs (quoted by Christeller). Vet.-Ber. für das Jahr 1861.
- ¹⁰Harms, Carsten: Die Knochenweiche, Osteomalacie, der Ziege (quoted by Christeller). Mag. ges. Tierh., 37, (1871): 257.
- ¹¹Hintze, R.: Das Wesen der Schnüffelkrankheit der Tiere (quoted by Christeller). Arch. f. Wissenschaft. prakt. Tierheilk., 35, 1910.
- ¹²Ingier, A.: Über die bei der Schnüffelkrankheit am Rumpf- und Extremitätenskelett auftretenden Veränderungen. Frankfurter Ztschr. f. Path., 12, (1913): 270.
- ¹³Jaffe, H. L., and Bodansky, A.: Experimental Fibrous Osteodystrophy in Hyperparathyroid Dogs. J. Exptl. Med., 52, (1930): 669.
- ¹⁴Kintner, J. H., and Holt, R. L.: Equine Osteomalacia. Philippine J. Sci., 49, (1932): 1.
- ¹⁵Klimmer und Schmidt: Beiträge zur Ätiologie der Haliteresis Ossium nebst therapeutischen Bemerkungen (quoted by Christeller). Monatsh. f. prakt. Tierheilk., 17, (1906): 481.
- ¹⁶Leisering: Rachitischer Kopf einer Ziege, Bericht über das Veterinärwesen im Königreich Sachsen für das Jahr 1872 (quoted by Christeller). G. C. Haubner, 17. Jahrg. 1873.
- ¹⁷Nieberle, K., and Cohrs, P.: Lehrbuch der speziellen pathologischen Anatomie der Haustiere. Gustav Fischer, Jena, Germany, (1949): 609.
- ¹⁸Nielsen, S. W., and McSherry, B. J.: Renal Hyperparathyroidism (Rubber Jaw Syndrome) in a Dog. J.A.V.M.A., 124, (April, 1954): 270.
- ¹⁹Platt, H.: Canine Chronic Nephritis. III. The Skeletal Syndrome in "Rubber Jaw." J. Comp. Path. and Therap., 61, (1951): 197.
- ²⁰Rehn, E.: Die Schnüffelkrankheit des Schweines und ihre Beziehungen zur Ostitis Fibrosa Infantilis des Menschen. Beitr. path. Anat., 12, (1908): 274.
- ²¹Roloff: Osteomalazie und Rachitis (quoted by Christeller). Mitt. tierärztl. Praxis preuss. Staate, 17, (1870): 155.
- ²²Roloff: Erweichung der Kopfknochen. Ztschr. f. prakt. Vet.-Wissenschaft., 2, (1874): 281.
- ²³Shore, T. L., and Binder, R. A.: A Case of Osteodystrophia Fibrosa. North Am. Vet., 38, (1957): 151.
- ²⁴Smith, H. A., and Jones, T. C.: Veterinary Pathology. Lea and Febiger, Philadelphia (1957): 662.
- ²⁵Theiler, A.: The Osteodystrophic Diseases of Domestic Animals. Vet. J., 90, (1934): 183.
- ²⁶Theiler, A., DuToit, P. J., and Malan, A. I.: Calcium and Phosphorus in the Nutrition of Growing Pigs. Onderstepoort J. Vet. Sci. and Anim. Indust., 9, (1937): 127.
- ²⁷Theiler, A.: The Influence of Variations in the Dietary Phosphorus and in the Ca:P Ratio on the Production of Rickets in Cattle. Onderstepoort J. Vet. Sci. and Anim. Indust., 8, (1937): 375.

²⁰Travino, G. S.: Renal Osteitis Fibrosa Cystica in a Cocker Spaniel, the "Rubber Jaw" Syndrome. *Southwest. Vet.*, 8, (1955): 338.

²¹Weber, M., and Backs, H.: Experimentelle Osteodystrophia Fibrosa beim Hund mit Pseudotumor und Cystenbildung am Kiefer. *Arch. path. Anat.*, 283, (1932): 752.

²²Wolff, O.: Rachitis der Schweine (quoted by Christeller). *Ztschr. Fleisch- u. Milchhyg.*, 7, (1879): 179.

Induced Tuberculosis in Swine

When tuberculous specimens from 76 swine in South Africa were typed, 57 were of bovine and 19 of human type. Avian tuberculosis is rare in South Africa. The majority of the lesions were in the submaxillary lymph node with an occasional one in the pharyngeal or mesenteric nodes. However, when 20 pigs, about 3 months old, were experimentally infected, the great majority of the lesions were not in the submaxillary or pharyngeal nodes.

When cultures were given *per os*, 2 pigs given the avian type developed no lesions; of 6 pigs given the human type, 5 developed no lesions but 1 developed extensive lesions; of 10 pigs given the bovine type culture, 3 developed generalized tuberculosis, 4 developed extensive lesions, 2 developed a few lesions, and 1 no lesions.

The 2 pigs given bovine type culture intranasally developed lesions chiefly in the bronchial and mediastinal nodes with 1 pig having a lesion in a pharyngeal node. In none of the pigs were the lesions confined to the head.—*E. M. Robinson in J. S. African V. M. A. (June, 1958): 129.*

Hog Cholera Controlled with Crystal Violet Vaccine.—In three heavily infected districts in Germany, hog cholera was controlled by vaccinating all pigs over 8 weeks old with 5 ml. of crystal violet vaccine, repeated in 14 days, in combination with strict hygienic measures. In a fourth district, the disease was controlled when, due to a shortage of vaccine, only 30 per cent of the pigs were vaccinated.—(*Mh. Vet. Med.*, 13: 165-168) *abstr. in Vet. Bull. (Oct., 1958): Item 3237.*

Results of Vaccinating with Lapinized Hog Cholera Virus.—Laboratory and field tests, in Poland, showed that three to seven days after pigs were vaccinated with a lapinized vaccine alone, 30 per cent of them

showed fever, a fall in leukocyte count, and sometimes dullness and diarrhea. This occurred especially in young pigs in poor condition.

Administration of anti-hog cholera serum with the vaccine reduced the incidence of this reaction to 2 per cent. The pigs excreted virus but it was apparently harmless to susceptible pigs.

Eight days after vaccination, the pigs challenged with 100,000 m.i.d. of virus remained healthy. The immunity lasted at least six months.—(*Méd. vét. Varsovie*, 14: 129-134) *abstr. in Vet. Bull. (Oct., 1958): Item 3236.*

Experimental Infection in Pigs with *Brucella Abortus*.—Four gilts, 4 months old, were infected with *Brucella abortus*, strain 544. The only sign of infection was inappetence and fatigue the next two days. Agglutination tests were positive at 1:320 on postinfection day 7, and 1:80 on day 63. The pigs were then killed and the organisms were recovered from the blood and organs. There was no evidence of a change from *Br. abortus* to *Br. suis*.—(*Rindertu-berk. u. Brucellose*, 6: 144-148) *abstr. in Vet. Bull. (Oct., 1958): Item 3135.*

So-Called "Heart Death" of Swine

The physiological factors in the condition of swine known in Europe as "heart death" were studied for seven years at Potsdam, Germany. Under experimental feeding no deaths occurred but, since the condition occurs irregularly, conclusions regarding the benefit of the diet were not possible.—*H. Gebauer and W. Ploetz in Monatsh. f. Vet.-med.*, (Sept. 1 and 15, 1958): 530 and 558.

A Viral Diarrhea in Pigs.—During 1956-57, a disease characterized by profuse yellowish diarrhea and anorexia occurred in 39 herds of swine in Italy. It seemed to be introduced with newly purchased animals. Recovery occurred in three to ten days. The disease could be transmitted to healthy pigs with feces from affected animals given orally, intravenously, or intraperitoneally. Laboratory animals were not susceptible. Recovered animals were immune and their serum contained antibodies against the agent, which is believed to be a virus. (Age of pigs not given).—*Vet. Bull. (Sept., 1958): Item 2858.*

Q Fever in Iowa Dairy Cattle

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SINCE ITS recognition in Australia,⁶ in 1937, Q fever has progressed to a position of military and public health significance in 51 countries on five continents.¹³ Although a variety of wild and domestic animal species are susceptible to either natural or experimental infection, mounting epidemiological evidence implicates domestic ruminants as the main reservoirs⁸ and sources of human infection.^{8,13,19,24,28}

Available information indicates that Q fever is a subclinical infection in cattle, sheep, and goats.^{21,22} However, such infected animals shed enormous numbers of *Rickettsia* at parturition in the fetal membranes and vaginal dejecta.^{23,25} Air sampling studies, conducted in and around barns housing infected ruminants, have demonstrated that a rickettsial aerosol is produced during the parturition process.^{5,20} Thus, *Coxiella burnetii*, the etiological agent of Q fever, is effectively seeded in the environment. The ability of this organism to withstand desiccation results in long-term environmental contamination.

Transfer of the disease is thought to occur by direct contact with infectious parturient material or indirect contact by means of contaminated dust.^{1,8,24,29} Cattle

and sheep have been experimentally infected by the respiratory route.^{1,28} Likewise, *C. burnetii* has been isolated from a number of tick species.³⁰ In some areas and under certain conditions, infected ticks are thought to serve as vectors among domestic ruminants in addition to perpetuating the disease in nature.^{7,13,24}

Indications are that man is most commonly infected by inhaling *Rickettsia*-contaminated dust.²⁴ Epidemiological investigations have demonstrated a relationship between human infection and association with domestic livestock or their quarters, or both.^{3,4,10,25}

Infected ruminants shed *C. burnetii* in their milk.^{10,12,17} However, the possibility that milk may serve as a vehicle of infection for man has been investigated without conclusive results. A correlation between the consumption of raw milk and the incidence of human infection has been demonstrated.^{2,3}

There has been some speculation concerning the apparent ability of the Q fever organism to establish itself in new host species, to develop direct methods of host to host transfer, and to acclimatize to new geographical areas.²⁴ Q fever has been recognized for a number of years in California^{18,22,27} and Texas,²⁴ and more recently in Ohio,²⁰ Wisconsin,¹⁴ Nebraska,²⁷ Maryland,²⁸ and Pennsylvania.²⁹

This is a report on an investigation of the status of Q fever in Iowa dairy cattle which was initiated in this laboratory in 1956.

MATERIALS AND METHODS

Bovine blood samples were collected from the Iowa State-Federal Brucellosis Laboratory. Samples were selected on a random basis without prior knowledge of area of origin or herd ownership. The specimens were collected weekly to biweekly in lots of 250 to 1,000; each lot of samples consisted of a variable number of groups (a group represents those collected from one source—herd, shipment, sale, etc.—and submitted by a veterinarian).

The first lot of specimens was collected on Nov. 8, 1956, the last on June 6, 1957. Herds serologi-

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The capillary agglutination antigen used in this study was provided by Dr. L. Luoto, Rocky Mountain Laboratories, U.S. Public Health Service.

*Recent Russian literature reports the occurrence of clinical signs in the bovine species.³¹ The reported clinical syndrome includes rhinitis, conjunctivitis, depression, anorexia, abortion, and decreased milk production. Herds infected with Q fever, by official regulation, are subject to strict quarantine, diversion of products (milk and meat) from human consumption, and mandatory herd blood tests every 25 to 30 days until two successive negative tests are passed. The presence of clinical signs in cattle in Russia and the apparent absence of such in this and various other countries may be due to variation in rickettsial strains.

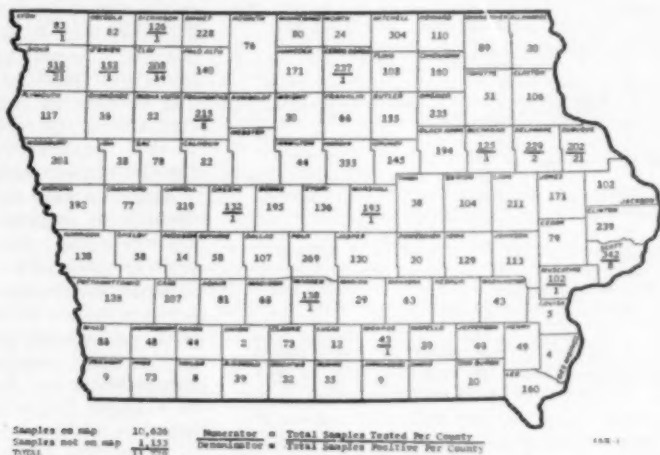
cally positive for *C. burnetii* were visited. Milk and blood samples were collected from the cows and blood specimens from the herd owners, attending veterinarians, and other individuals known to have had routine contact with the herd.

All blood specimens were screen tested by the Luoto capillary agglutination test.^{20,22} A large number of samples,²⁰ both capillary agglutination positives and negatives, were submitted to the Iowa

dairy cattle origin; the remainder represent beef cattle. Q fever is thought to occur infrequently, if at all, in beef cattle.

As it was not possible to identify each group of test specimens as to the type of cattle represented, computations of incidence figures are based on total numbers of specimens tested. However, all positive

Fig. 1—Geographical distribution map showing results of Iowa bovine Q fever serological survey.



State Hygienic Laboratory for confirmatory complement-fixation testing, and to the U.S. Public Health Service Rocky Mountain Laboratory for confirmatory complement-fixation and capillary agglutination testing.[†]

Standard guinea pig procedures were used to isolate the Q fever Rickettsia. Blood samples were collected from adult guinea pigs by cardiac puncture before, and five weeks after, intraperitoneal inoculation with 5 cc. of raw milk. The paired (pre- and postinoculation) serums were tested by both capillary agglutination and complement-fixation for evidence of induced serological response for Q fever. Evidence of isolation consisted of serological negativity by both tests on the preinoculation sample, and serological positivity by both tests (at least 1:16 by complement-fixation) on the post-inoculation sample.

RESULTS AND DISCUSSION

Between 80 and 87 per cent of the bovine blood specimens submitted to the Iowa State-Federal Brucellosis Laboratory are of

dairy herd origin. If it were possible to adjust the figures and compute the incidence rates on the basis of dairy blood specimens only, the rates would be greater.

Likewise, since each group of bovine blood specimens submitted for Brucella serology does not constitute a complete herd test, it is not possible to compute an exact herd incidence figure. However, if each group of blood specimens is accepted as representing a premise or at least a partial herd test, a herd incidence figure can be approximated.

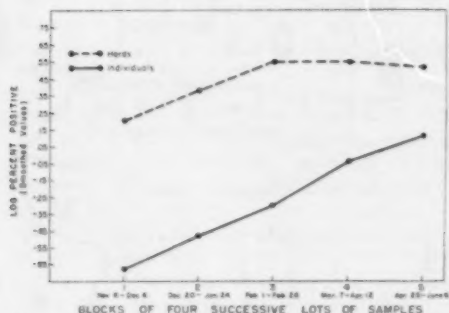
These two factors—incomplete herd tests and the presence of a limited number of beef cattle blood samples—exert a negative influence on the computed incidence rates of Q fever among Iowa dairy cattle. Consequently, all stated incidence figures are minimal.

A total of 11,779 bovine blood specimens (767 groups; av. 15.3 per group) were tested and 84 (0.71%) were positive for Q fever. Twenty-five of the 767 groups contained one or more Q fever-positive samples. The approximate herd incidence figure is 3.25 per cent.

²⁰The number of samples involved is sufficiently large so as to be statistically representative.

[†]A comparison of these various test results will be reported later; these data demonstrate the Luoto Q fever capillary agglutination test to be a highly reliable and valid serodiagnostic procedure.

Whenever possible, blood specimens were identified as to county of origin and tabulated on a state geographical distribution map (fig. 1); 10,626 of the 11,779 samples were so identified. No positive specimens were found among the 1,153 blood samples not so coded. Indications are that foci of enzootic bovine Q fever exist in the northwestern and east central sections of the state.



Graph 1—Incidence of bovine Q fever in Iowa as indicated by the serological survey.

When plotted on a time basis, the incidence of Q fever positivity increased during the seven-month survey period (graph 1). The curve based on percentage of individual positivity plotted against successive blocks of samples (bottom curve) reflects a progressively greater incidence of positivity. The slope of this curve is statistically significant ($P = <0.001$).

Likewise, the curve based on percentage of herd positivity plotted against successive blocks of samples indicates an increase in herd positivity. Although the rate of increase in herd positivity is not constant throughout the survey period, the slope of this curve is of statistical significance ($P = <0.05$).

The 84 individual Q fever-positive blood specimens were found in 25 dairy herds as follows: each of 17 herds contained 1 positive cow and one herd each contained 5, 6, 7, 8, 9, 12, and 20 positive animals, respectively. There were 374 cattle in the 25 positive herds. The average of 15 cattle per positive herd closely approximates the estimated figure of 15.3 cattle per herd tested.

A study of four serologically positive herds was carried on for five months. Of a

total of 25 replacement cows added to the four herds during the study, 10 cows (40%) were found serologically positive for Q fever on subsequent herd tests.

It was not possible to test and demonstrate conclusively that the 10 cattle were not Q fever-positive when added to the study herds. However, since the incidence of Q fever serological positivity in Iowa cattle was 0.71 per cent, it is highly improbable that 40 per cent of these 25 replacement cows added to four different herds were positive at the time of purchase. The serological conversion rate of 40 per cent among the replacement cows is similar to that found by investigators working in the Q fever enzootic areas of California.⁹

Attempts were made to isolate *C. burnetii* from milk samples from 63 serologically positive cattle; the organism was isolated from the milk of 9.

Blood specimens were collected from 60 persons known to have had routine contact with serologically positive dairy herds. The only positive specimen was from a practicing veterinarian. It was positive at a titer of 1:16 on the initial test but reverted to negative within six months.

These data demonstrate the existence of enzootic Q fever in Iowa dairy cattle. The incidence of bovine serological positivity, on both an individual and a herd basis, was observed to increase during the study period. Although the survey period did not cover a full year, the demonstrated increase in the incidence of serological positivity may indicate seasonal variation.

The difference in the slope of the two curves representing individual and herd serological positivity is statistically significant ($P = <0.001$), and may reflect different rates of intra- and inter-herd transmission of the disease; such a difference might be expected on an epizootiological basis.

Intra-herd transmission of the disease was indicated by the unusually high incidence of serological positivity found among replacement cows added to infected herds.

During this same phase of the study it was noticed that, although 40 per cent of the replacement cows added to infected herds were serologically positive within five months, many of the cattle found to be negative on the initial herd test remained negative throughout the study period. The vast majority of these consistently negative cattle had been in the herd for a number of years. Indications are that such cattle have been infected and, although their serum Q

⁹A block of samples represents those samples collected from the laboratory on four successive occasions. The last block represents samples collected on only three successive occasions. Samples were grouped into blocks to reduce chance irregularities.

¹⁰One or more positive samples.

fever titers have fallen below detectable levels, are immune to reinfection.

This same hypothesis might account for the low incidence of Q fever serological positivity among those persons having contact with infected herds over long periods of time.

SUMMARY

1) Of 11,779 bovine blood specimens tested in Iowa, 84 (0.71%) were found to be serologically positive for Q fever.

2) An estimated 3.25 per cent of the herds tested were found to include 1 or more Q fever-positive animals.

3) The incidence of bovine Q fever serological positivity, on both a herd and an individual basis, was observed to increase during the study period.

4) *Coxiella burnetii* was isolated from the milk of 9 of 63 serologically positive cows.

5) Only one of 60 blood specimens collected from persons known to have had routine contact with serologically positive dairy herds was positive for Q fever.

References

¹Abinanti, F. R., Welsh, H. H., Hartwell, H. W., Lennette, E. H., and Brunetti, Oscar: Q Fever Studies. 16. Some Aspects of the Experimental Infection Induced in Sheep by the Intratracheal Route of Inoculation. *Am. J. Hyg.*, 57, (1953): 170-184.

²Beck, M. D., Bell, J. A., Shaw, B. W., and Huebner, R. J.: Q Fever Studies in Southern California. 2. An Epidemiological Study of 300 Cases. *U.S. Pub. Health Rep.*, 64, (1949): 41-56.

³Bell, J. A., Beck, M. D., and Huebner, R. J.: Epidemiological Studies of Q Fever in Southern California. *J.Am.M.A.*, 142, (1950): 868-872.

⁴Clark, W. H., Lennette, E. H., and Romer, M. S.: Q Fever in California. 11. An Epidemiologic Summary of 350 Cases Occurring in Northern California During 1948-1949. *Am. J. Hyg.*, 54, (1951): 319-330.

⁵DeLay, P. D., Lennette, E. H., and DeOme, K. B.: Q Fever in California. 2. Recovery of *Coxiella burnetii* from Naturally Infected Airborne Dust. *J. Immunol.*, 65, (1950): 211-220.

⁶Derrick, E. H.: Q Fever, a New Fever Entity: Clinical Features, Diagnosis, and Laboratory Investigation. *Med. J. Australia*, 2, (1937): 281-299.

⁷Derrick, E. H.: The Epidemiology of Q Fever. *J. Hyg.*, 43, (1944): 357-360.

⁸Enright, J. B.: The Role of Animals in Q Fever. *Vet. Med.*, 46, (1951): 383-386.

⁹Huebner, R. J., and Bell, J. A.: California Q Fever Studies. *J.Am.M.A.*, 145, (1951): 301-305.

¹⁰Huebner, R. J., Jellison, W. L., Beck, M. D., Parker, R. R., and Shepard, C. C.: Q Fever Studies in Southern California. 1. Recovery of *Rickettsia*

Burneti from Raw Milk. *U.S. Pub. Health Rep.*, 63, (1948): 214-222.

¹¹Jellison, W. L., Ormsbee, R. A., Beck, M. D., Huebner, R. J., Parker, R. R., and Bell, E. J.: Q Fever Studies in Southern California. 5. Natural Infection in a Dairy Cow. *U.S. Pub. Health Rep.*, 63, (1948): 1611-1618.

¹²Jellison, W. J., Welsh, H. H., Elson, B. E., and Huebner, R. J.: Q Fever Studies in Southern California. 11. Recovery of *Coxiella burnetii* from Milk of Sheep. *U.S. Pub. Health Rep.*, 65, (1950): 395-399.

¹³Kaplan, M. M., and Bertagna, P.: The Geographical Distribution of Q Fever. *Bull. World Health Org.*, 13, (1955): 829-860.

¹⁴Kitze, L. K.: Q Fever in Wisconsin, Serologic Evidence of Infection in Cattle and in Human Beings and Recovery of *C. burnetii* from Cattle. *Am. J. Hyg.*, 65, (1957): 239-247.

¹⁵Lennette, E. H.: Q Fever in California. *California Med.*, 69, (1948): 91-95.

¹⁶Lennette, E. H., and Clark, W. H.: Observations on the Epidemiology of Q Fever in Northern California. *J.Am.M.A.*, 145, (1951): 306-309.

¹⁷Lennette, E. H., Clark, W. H., Abianti, M. M., Brunetti, O., and Covert, J. M.: Q Fever Studies. 13. The Effects of Pasteurization on *Coxiella burnetii* in Naturally Infected Milk. *Am. J. Hyg.*, 55, (1952): 246-253.

¹⁸Lennette, E. H., Clark, W. H., and Dean, B. H.: Sheep and Goats in the Epidemiology of Q Fever in Northern California. *Am. J. Trop. Med.*, 29, (1949): 527-541.

¹⁹Lennette, E. H., and Meiklejohn, G.: Q Fever in Central and Northern California. *California Med.*, 69, (1948): 197-199.

²⁰Lennette, E. H., and Welsh, H. H.: Q Fever in California. 10. Recovery of *Coxiella burnetii* from the Air of Premises Harboring Infected Goats. *Am. J. Hyg.*, 54, (1951): 44-49.

²¹Luoto, L.: A Capillary Agglutination Test for Bovine Q Fever. *J. Immunol.*, 71, (1953): 226-231.

²²Luoto, L.: A Capillary-Tube Test for Antibody against *Coxiella burnetii* in Human, Guinea Pig, and Sheep Sera. *J. Immunol.*, 77, (1956): 294-298.

²³Luoto, L., and Huebner, R. J.: Q Fever Studies in Southern California 9. Isolation of Q Fever Organisms from Parturient Placentas of Naturally Infected Dairy Cows. *U.S. Pub. Health Rep.*, 65, (1950): 541-544.

²⁴Marmion, B. P.: World-Wide Q Fever. *Lancet* (Sept. 19, 1953): 616-617.

²⁵Marmion, B. P., and Harvey, M. S.: The Varying Epidemiology of Q Fever in the South-East Region of Great Britain. 1. In an Urban Area. *J. Hyg.*, 54, (1956): 533-546.

²⁶Marmion, B. P., and Stoker, M. G. P.: The Varying Epidemiology of Q Fever in the South-East Region of Great Britain. 2. In Two Rural Areas. *J. Hyg.*, 54, (1956): 547-561.

²⁷McIntire, M. S., Wiebelhaus, H. A., and Youngstrom, J. A.: Serological Survey of Packing House Workers in Omaha for Q Fever. *Nebraska State M. J.*, 43, (1958): 206-209.

²⁸National Office of Vital Statistics, Public Health Service, U.S. Department of Health, Education and Welfare: Morbidity and Mortality Weekly Rep., 7, (1958): 1.

²⁹National Office of Vital Statistics, Public Health Service, U.S. Department of Health, Edu-

cation and Welfare: Morbidity and Mortality Weekly Rep., 7, (1958): 2.

²⁰Reed, C. F., and Wentworth, B. B.: Q Fever Studies in Ohio. J.A.V.M.A., 130, (May 15, 1957): 459-461.

²¹Rostovtseva, I. A.: The Diagnosis of Q Fever in Domestic Animals and Measures for Eradication of the Disease. Veterinariya, 33, (1956): 53-56.

²²Shepard, C. C., and Huebner, R. J.: Q Fever in Los Angeles County. Am. J. Pub. Health, 38, (1948): 781-788.

²³Stoener, H. G.: Experimental Q Fever in Cattle—Epidemiologic Aspects. J.A.V.M.A., 118, (March, 1951): 170-174.

²⁴Topping, N. H., Shepard, C. C., and Irons, J. V.: Q Fever in the United States. 1. Epidemiological Studies of an Outbreak Among Stock Handlers and Slaughterhouse Workers. J.A.M.A., 133, (1947): 813-815.

²⁵Welsh, H. H., Lennette, E. H., Abinanti, F. R., and Winn, J. F.: Q Fever in California. 4. Occurrence of *Coxiella Burnetii* in the Placenta of Naturally Infected Sheep. U.S. Pub. Health Rep., 66, (1951): 1473-1477.

²⁶Wentworth, B. B.: Historical Review of the Literature on Q Fever. Bact. Rev., 19, (1955): 129-149.

²⁷Young, F. W.: Q Fever in Artesia, California. California Med., 69, (1948): 89-90.

Associated Organisms and Tetanus

Tetanus was sometimes produced in mice when small numbers of pure *Clostridium tetani* spores were inoculated. Inclusion of toxic coliform organisms in the inoculum favored tetanic infection, whereas nontoxic coliforms had an inhibitory effect and *Bacillus subtilis* often prevented the disease. Tissue damage, even when remote from the site of the infection, favored the development of tetanus. The occurrence of tetanic bacillemia depended on certain associated organisms; it resulted in a shorter incubation period and a more violent course.

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Under certain circumstances, *Cl. tetani* entered the blood stream within 30 minutes after intratissue inoculation in mice. The usual doses of antitoxin had little effect in some mixed infections, indicating that specific therapy against the accompanying organisms would be beneficial.

Tetanus could develop from infection originating in the alimentary tract.

• • •

Tetanus spores are positively chemotactic toward phagocytes; monocytes are the most active but polymorphs also play a part. The toxin-producing tetanus bacilli exert a negative chemotaxis. Certain organisms in mixed infections are also negatively

chemotactic to phagocytes, thus aiding the tetanus spores to germinate.

Tetanus toxins enter the central nervous system more rapidly from the blood stream when the permeability of the blood-brain barrier is increased, as can result from the metabolic products of certain accompanying organisms.—J. Kalich in Zentralbl. f. Vet.-med. (Jan. 1957): 51; (July, 1957): 415 and 431.

Chlorpromazine vs. Barbiturates in Tetanus.—In a clinical trial on 75 human patients with tetanus, treatment with chlorpromazine yielded similar results to that with barbiturates and was easier to manage since it controlled the convulsions without causing loss of consciousness or noticeable respiratory depression.—(Lancet, May 10, 1958:987-991) abstr. in Vet. Bull. (Oct., 1958): Item 3160.

The Prognosis in Tetanus.—A study of the records of 43 tetanus patients in Germany (of which 29 died) indicated that the length of the incubation period had no prognostic value. The "invasion period," the time from the first manifestation to the first spasm, seemed to have more prognostic value. Of the patients with an invasion period of more than four days, 33 per cent recovered, in contrast to the 9 per cent which recovered when this period was less than four days.—J. Am. M. A. (Aug. 9, 1958): 1880.

Transfer of Immunity Against Tetanus from Dam to Foal.—Specific antibodies in titers higher than considered sufficient for prophylaxis against tetanus were found a few hours after birth in 7 of 8 foals born to immunized mares. The titer in the foals increased the first few days, presumably as a result of antitoxin in the colostrum, and lasted for over a month.—(Vet. ital., 9: 10-7) abstr. in Vet. Bull. (Oct., 1958): Item 3159.

Intercranial Actinomycosis

When a cow with locomotor ataxia was slaughtered, in Italy, an actinomycotic granuloma was found in the cranial cavity involving the optic fossa, the pituitary body, the base of the pons, the internal carotid artery, and the third to sixth cranial nerves.—Vet. Bull. (July, 1958): Item 2082.

Treating Bovine Bracken Poisoning

In 1941, it was found that D-batyl alcohol (D-a-octadecyl-glycerol-ether) was a component of a fraction of fat from bone marrow which was effective against granulocytopenia. It was later found that synthetic DL-batyl alcohol increased the survival time of mice given total body irradiation. Since bracken poisoning produced a bone marrow lesion closely resembling that of excessive irradiation, this agent was used to treat cattle in which bracken poisoning had been induced.

When pyrexia and petechiae appeared in 2 such steers, 1 was treated for seven days with DL-batyl alcohol (1 Gm. in 10 ml. warm olive oil subcutaneously) plus 500 mg. of oxytetracycline intravenously, and 3 million units of penicillin intramuscularly. The leukocyte fall was halted and the fever abated, and after a later five days of treatment, the animal recovered. The control animal was similarly treated with the oil and antibiotics but without the DL-batyl alcohol for seven days before it died.

In a second trial, another preparation (25 to 50 ml. of 2% batyl alcohol in 5% Tween 80 and 1% saline solution) was given intravenously to 2 yearlings showing bracken poisoning, with recovery. Treatment was withheld in another animal until the leukocyte count was only 1,500 and the platelets 2,500 per cmm.; the erythrocyte count was normal, showing that there had not been extensive hemorrhage. However, shortly after treatment started, the erythrocyte count fell, blood was passed in the feces, and the animal died.

Nine naturally occurring cases in heifers 5 to 24 months old, each with temperatures of 104 to 108 F., were treated successfully with daily treatments of 0.5 to 1.0 Gm of batyl alcohol given by slow intravenous injection, together with oxytetracycline or sulfadimidine intravenously, and procaine penicillin intramuscularly. However, 5 heifers with advanced cases died after similar treatment.

The toxic agent seems to arrest mitosis in the bone marrow, and probably in the epithelial and connective tissues, and also in the fetus in pregnant cows. One treated cow recovered, then aborted a fetus that had been dead several days.

Synthetic DL-batyl alcohol apparently stimulates bone marrow activity but the mode of action is not known. Other agents

which depress bone marrow activity, leading to aplasia and almost identical lesions, include irradiation, several antimetabolites and antivitamin, biological alkylating agents such as nitrogen mustard, certain chemotherapeutic agents, and the unidentified factor in trichloroethylene-extracted soybean oil meal.—*J. A. Evans et al. in Brit. Med. J. (July, 1958): 243.*

Mesquite Bean Poisoning in Cattle

In areas of Texas, New Mexico, and Oklahoma where mesquite trees grow, there is often a serious disease of cattle, known as "jaw and tongue trouble," with a morbidity of up to 50 per cent and mortality of 10 per cent. The animals salivate profusely, chew continuously, and often drop regurgitated material. The tongue may protrude up to 4 inches but is not paralyzed. The affected animals are usually anemic and emaciated, and half of them may show sublingual or submaxillary edema.

It is believed that the sugar in the mesquite beans has changed the bacterial flora in the rumen so that the animal no longer can digest cellulose or synthesize B vitamins efficiently. The condition most often occurs during a drought, when cattle are forced to eat large quantities of the beans for periods of two months or more. These animals gain weight on a good concentrate ration or on lush green pasture, but they can not utilize hay. No beneficial treatment is known.—*J. W. Dollahite and W. V. Anthony in Southwest. Vet. (Spring, 1958): 209.*

Photosensitization in Cattle

Within a period of eight days, all of the adults and older calves in a herd of 36 beef cattle in Australia developed severe photosensitization, and 15 died. The condition was marked by prostration, discharge from the eyes and nose, hardening of the skin in various areas and, in some cases, jaundice. It was suspected that aphid-infested thistles were the cause. (The color of the affected skin was not mentioned.)—*Vet. Bull. (Aug., 1958): Item 2623.*

Nutrition and Onset of Semen Formation.—Three pairs of identical twin bull calves, 1 twin on a high plane of nutrition, the other on a low plane, were compared by

studying the semen collected by electroejaculation.

In one pair, semen collections were made from the time they were 5 to 10½ months old, when their weight difference was about 200 lb. When 9 months old, the semen volume from the well-fed calf had increased gradually to 10 ml., approximately three times that of the underfed twin. Spermatozoa appeared in the semen of the former at 9 months, in the latter three weeks later. When examined after slaughter, the reproductive organs of the better-fed bulls were considerably heavier than those of their twins.—*Nutr. Rev.* (July, 1958): 209.

Fatty Acid Deficiency in Parakeratosis

Parakeratosis is a disease of feeder pigs characterized by hyperkeratosis of the skin and reduced growth rates. It is associated with good to excellent nutritional standards and with 1 to 2 per cent levels of calcium in the ration. Spontaneous recovery occurs in mildly or moderately affected pigs.

In two laboratory trials, parakeratosis was produced in normal, healthy weaned feeder pigs. A deficiency of essential fatty acid was thought to be created by excessive levels of growth stimulants in a well-balanced swine ration; the rate of biosynthesis of the unsaturated fatty acids presumably was unable to meet the demands of the body.

The level of calcium was high in the first trial and low in the second. It was thought that calcium decreased the digestibility of the fat present in the ration by a direct linkage with it.

In both trials, several lots of pigs were fed the basal ration supplemented with a soybean oil preparation (containing 54% linoleic acid) at a level of 10 to 23 per cent by weight. Of the 30 normal pigs on a low calcium ration, all developed parakeratosis except the 5 which were fed oil at the 23 per cent level. This included two lots, of 5 pigs each, which were given basal rations supplemented with zinc sulfate at 200 p.p.m. and hydrogenated fat at 16 per cent by weight. These lots were included to determine if fat, per se, could prevent the disease, and to evaluate the role given zinc in the cause of this disease (*i. e.*, that the disease may be a zinc deficiency).

Spontaneous recovery, as indicated by the improvement of skin lesions and increased growth rates, occurred in the animals with experimentally produced para-

keratosis without a change in the rations. It was thought that spontaneous recovery occurred when the rate of gain was reduced so that the rate of biosynthesis of the essential fatty acids in the body could meet the requirements for normal growth.

Exudate epidermitis, another dermatosis of swine, affects 1- to 5-week-old suckling pigs. It appears similar to parakeratosis in its epizootic characteristics and microscopic lesions. There also is some evidence that it responds to essential fatty acid therapy.

Zinc sulfate (100 to 200 p.p.m.) added to the rations of pigs with parakeratosis has therapeutic value. In the second trial, pigs with parakeratosis were treated by supplementing their basal rations with zinc (200 p.p.m.) and soybean oil (23% by weight), and by feeding a low-energy ration. Little difference was observed in the results when the ration was supplemented with oil or zinc. Comparable results also were obtained by the low-energy ration; however, the growth rates were lower than those of pigs in the zinc- and oil-supplemented lots. In pigs in the control lot, the skin lesions continued to progress and the growth rates were markedly reduced.—[L. J. Hanson, D. K. Sorensen, and H. C. H. Kernkamp: *Essential Fatty Acid Deficiency—Its Role in Parakeratosis*. *Am. J. Vet. Res.*, 19, (Oct., 1958): 921-930.]

Susceptibility of Cattle to Ocular Carcinoma.—Reliable research has now shown that there is no firm basis for the commonly-held belief that Hereford cattle are more susceptible to ocular carcinoma than other breeds of cattle.—W. H. Eyestone, *Nat'l. Instit. Health, 4th Ann. Meeting, Oct. 14, 1958.*

Bovine Rumen Microflora

An unusual number of *Pseudomonas* and *Proteus* species and a significant increase in coliform organisms have been found in the rumens of cows with a condition characterized by indigestion, enteritis, and liver toxic reactions. The authors believe that the clinical changes observed were due to this great derangement of the normal facultative anaerobic microflora, because the animals recovered when cultures of the normal types were introduced into the rumen and could be recovered in normal numbers.—Mansson and Nilehn in *Nord. Vet-med.*, 10, (March, 1958): 161.—R. KLUSSENDORF.

Growth of Veterinary Research

Without research there would be little progress. Conversely, if sound research means progress, the veterinary profession must be making marked advancement. The quality of research may be difficult to evaluate immediately, but the quantity of veterinary research is roughly indicated by the increase in size of the *American Journal of Veterinary Research*. Of course, veterinary research is also reported elsewhere, and too much true research, resulting from observations on calls and in the surgery, is never published as such.

The Research Journal was established as a quarterly with the October, 1940, issue. The first 11 annual volumes averaged about 400 pages, but the size has nearly tripled in the past seven years. From 380 pages in 1951, the volumes increased to 592 pages in 1952, to 822 in 1956 and, if larger issues could have been published, the 1958 volume would have been well over 1,100 instead of the actual 1,024 pages. Furthermore, a new quarterly journal, *Avian Diseases* (about 500 pages annually), published by the Cornell Veterinarian, was launched in 1957; most of the articles in it are reports on research.

A BIMONTHLY RESEARCH JOURNAL

Beginning with the January issue of 1959, the *American Journal of Veterinary Research* will be issued bimonthly, at the first of the month. The backlog of manuscripts accumulated in the past year has resulted in an objectionably long time-lag between receipt and publication. This should be corrected in the next few issues.

The international status of the Research Journal is indicated by the following data. In 1958, of the 176 manuscripts published, 19 (10.8%) originated outside of North America; about 23 per cent of the 3,297 subscriptions were from abroad.

INCREASE IN GRADUATE STUDENTS

A continued growth in veterinary research activities is indicated by the increase in veterinarians engaged in postgraduate study. According to student enrollment data, reported in the December issue of the JOURNAL of the AVMA for many years, there were 34 graduate students in 1940, 80 in 1946, 164 in 1952, and 252 in 1958 (see page 618). In addition, a number of institutions other than colleges of veteri-

nary medicine have similar graduate courses for veterinarians.

During the 1957-1958 academic year, 37 veterinarians were awarded M.S. degrees, 16 received Ph.D. degrees, and 30 earned public health degrees (see JOURNAL, Oct. 1, 1958: 396).

This increase in research activity has posed problems in the reviewing as well as in the publishing of research manuscripts.

REVISED COUNCIL ON RESEARCH

Since the inception of the Research Journal, all of the reviewing of submitted articles, with a few exceptions, has been done by the 15 members of the Research Council, each of whom represented a special field. These men have contributed generously of their time but the load, particularly in certain fields, has become burdensome. Furthermore, several fields in which there previously had been little investigation were not represented on the Council.

With the adoption of the new AVMA constitution, at Philadelphia, the name of the Council has been changed to the Council on Research, the number of members was reduced to ten, and its functions are to be more administrative and directive. The Council's new Committee on Journal has approved a list of reviewers (additional scrutineers) for manuscripts.

SHIFT IN TYPE OF RESEARCH

The type of veterinary research has changed in recent decades. In 1941, of 81 manuscripts published in the Research Journal, over 40 per cent were on clinical subjects, such as the treatment of infectious diseases, mastitis, and vitamin deficiencies. In 1958, of the 176 manuscripts published, only about 27 per cent were of a similar clinical nature. The trend is toward more research on subjects such as electrophoretic analyses, electrocardiography, and autoradiography.

Whether all of these projects could truly be defined as veterinary research and how many of them are merely research for the sake of research might be questioned. However, if the research worker has a thorough appreciation of animal life and its problems, he will naturally apply his findings, so far as possible, to the veterinary field. If not, it is to be hoped that allied fields will benefit.

Current Literature

ABSTRACTS

Ringworm Fungi of Feral Rodents

None of the 966 feral rodents of 8 species which were trapped and surveyed for the presence of dermatophytes had skin lesions, and all of the collected hair specimens were negative for fungi by direct microscopic and ultraviolet light examination. However, 11.4 per cent of the animals yielded cultures of dermatophytes or dermatophyte-like species: *Trichophyton mentagrophytes*, 17 isolates; *Microsporum gypsum*, 13 isolates; and a new but unidentified species of *Microsporum*, 83 isolates.

The correlation of these observations with ecological factors and their public health significance are discussed.—[Sturgis McKeever, Robert W. Menges, William Kaplan, and Libero Ajello: Ringworm Fungi of Feral Rodents in Southwestern Georgia. *Am. J. Vet. Res.*, 19, (Oct., 1958): 969-972.]

Haemonchus in Cattle and Sheep

A study was made of 2,716 male and 2,880 female *Haemonchus* organisms recovered from cattle and sheep that were naturally and experimentally infected with *Haemonchus* originally isolated from cattle and sheep and maintained as pure "strains" by repeated passage through other cattle and sheep.

On the basis of (1) spicular measurements, (2) prepatent periods of infection, and (3) the relative abilities of the two strains to infect calves and lambs, it was concluded that these strains were comparable to the two species of *Haemonchus*, i.e., *H. placei* and *H. contortus*, reported by Australian workers to be the normal parasites of cattle and sheep, respectively.—[Harry Herlich, Dale A. Porter, and Robert A. Knight: A Study of *Haemonchus* in Cattle and Sheep. *Am. J. Vet. Res.*, 19, (Oct., 1958): 866-872.]

Neural Mechanisms in Sexual Behavior

The gross neuroanatomy to the genitalia in the bull and the ram is described and illustrated. The source of nerve supply may be grouped into cranial (cervical, thoracic, lumbar), middle (inguinal), and caudal (sacral) components. The anastomosis between the sciatic and deep perineal nerves is shown to have efferent function to musculature derived from cloacal sphincture of embryo. Neurophysiological methods have demonstrated that the nerve supply to the protractor and retractor preputiae muscles is from the brachial plexus. These methods also were used to show the dual nerve supply to the retractor penis muscle. The pattern of afferent flow in sacral dorsal roots, as related to peripheral nerves, was characterized.—[L. L. Larson and R. L. Kitchell: Neural Mechanisms in

Sexual Behavior. II. Gross Neuroanatomical and Correlative Neurophysiological Studies of the External Genitalia of the Bull and the Ram. *Am. J. Vet. Res.*, 19, (Oct., 1958): 853-865.]

Experimental Infections with Trichomonads

In 3 virgin heifers inoculated intracervically at estrus with a mixture of milk-diluted semen and trichomonad cultures from the nose, stomach, or cecum of swine, infections lasting 35 to 77 days resulted. Two heifers, similarly inoculated with *Trichomonas foetus* and semen, had infections lasting 20 and 108 days. None of the heifers became pregnant.

In 6 heifers inoculated intravaginally with material containing trichomonads from the nose, stomach, or cecum of pigs, infections lasting for 33 to 135 days resulted.

Intrauterine inoculation with porcine cecal trichomonad culture by laparotomy into a heifer, four months pregnant, was followed by an abortion 20 days later; trichomonads were present in the fetal fluids and fetus. Two heifers, three months pregnant, similarly inoculated with porcine gastric trichomonads or *T. foetus* underwent normal pregnancies with no evidence of infection. A bull became infected with swine cecal trichomonads as a result of breeding an experimentally infected heifer; the infection was later transmitted to a virgin heifer by coitus. The bull remained positive for four months.

Of 8 heifers naturally or artificially inseminated during or after infections with trichomonads of swine origin or with *T. foetus*, 2 conceived when bred during an infection with nasal or cecal trichomonads, 2 conceived as a result of inseminations 7 or 11 weeks after the last positive vaginal samples after infections with *T. foetus*, and the remainder did not become pregnant.—[Paul R. Fitzgerald, A. Earl Johnson, Joseph L. Thorne, and Datus M. Hammond: Experimental Infections of the Bovine Genital System with Trichomonads from the Digestive Tracts of Swine. *Am. J. Vet. Res.*, 19, (Oct., 1958): 775-779.]

Electrophoretic Analysis of Rabbit Serum

Serum protein percentages were determined weekly for one month on 30 rabbits. All animals were necropsied and complete gross and histopathological examinations were made. The mean values obtained from 18 normal rabbits were as follows: albumin 64.01 ± 1.63 per cent; α 1 globulin 7.21 ± 0.96 per cent; α 2 globulin, 5.80 ± 1.05 per cent; β globulin, 12.77 ± 1.20 per cent; and γ globulin, 9.91 ± 1.10 per cent. Migration values employing a C/AF ratio [C = distance of component migration (center of band) from origin; AF = distance of albumin front from origin] were also computed. Sex and breed were shown to have no influence on serum protein composition and migration values. Abnor-

mal serum protein patterns of 11 animals are correlated with pathological findings.—[R. C. Allen and D. F. Watson: *Paper Electrophoretic Analysis of Rabbit Serum as an Aid in the Selection of Experimental Rabbits*. *Am. J. Vet. Res.*, 19, (Oct., 1958): 1001-1003.]

Antimetabolites and Newcastle Disease Virus

The effects of various concentrations of anti-metabolites on the growth of Newcastle disease virus (NDV) in chorioallantoic membranes (CAM) suspended in Tyrode's solution were studied.

The highest concentrations of the various anti-metabolites used [2,4-dinitrophenol (DNP), urethane, sodium azide, proflavin, sodium malonate, and sodium fluoroacetate] were not lethal for NDV and apparently did not damage the cells of the CAM which support virus growth.

At concentrations of 5 to 40 μ per milliliter, DNP retarded the growth of NDV in CAM cultures. The growth of NDV decreased as the concentration of DNP in the Tyrode's solution was increased. Glycolysis was stimulated in both infected and noninfected tissue by the presence of DNP.

Proflavin and sodium azide, at concentrations of 5 to 40 μ per milliliter, were effective in inhibiting the production of NDV.

No significant inhibition of the growth of NDV was demonstrable in Tyrode's solutions that contained 0.01 M of urethane, sodium malonate, or sodium fluoroacetate.—[F. Zuscbeke, R. P. Hanson, and C. A. Brandly: *The Influence of Antimetabolites on the Growth of Newcastle Disease Virus in Chorioallantoic Membranes Suspended in Tyrode's Solution*. *Am. J. Vet. Res.*, 19, (Oct., 1958): 1004-1009.]

Phenothiazine Treatment of Yearling Bees

The efficacy of a program of combined free-choice ingestion and therapeutic administration of the drug on the control of gastrointestinal parasitism was determined by worm counts made at necropsy. To study the effect of the potential availability of infective larvae to the cattle, forage samples were examined periodically to recover the preparasitic stages of the nematodes.

The use of phenothiazine was not of economic benefit, except to those animals grazing on fescue forage. The cattle gains appeared to be influenced more by the nutritional adequacy of the temporary forages (oats and rye grass) and crimson clover than by the anthelmintic and larvicidal action of the drug. However, the parasitism of cattle grazing on these forages was at a subclinical level, so any possible benefit from the drug could not be adequately ascertained. The drug was found to be effective in larvicidal action against preinfective stages on pasture and in anthelmintic action on adult stomach worms if the average daily intake

was 2 Gm. or more and therapeutic drenches were given at least twice during the winter and spring grazing period.

Although the number of parasitic larvae of the stomach worms was considerably reduced by the drug, especially when the average daily intake was higher than 2 Gm., the type of pasture grazed by the animals appeared to be more closely correlated with the number of such larvae found at necropsy.—[H. H. Vegors, W. N. Smith, D. M. Baird, H. Ciordia, W. E. Bizzell, and O. E. Sell: *Phenothiazine Treatment of Yearling Bees on Winter Pastures*. *Am. J. Vet. Res.*, 19, (Oct., 1958): 805-810.]

Cross Transmission of Nematodes

Nineteen pigs of mixed breeding, 26 to 48 days old, became infected with *Trichostrongylus colubriformis* after oral administration of 2,900 to 114,600 infective larvae, and 17 of these pigs harbored sexually mature adults at necropsy. Pigs older than 78 days could not be infected. In susceptible animals, the infection was transitory and the pathological changes produced were minor.—[F. G. Tromba and F. W. Douvres: *Cross Transmission of Nematodes of Domestic Animals I. Experimental Infection of Swine with Trichostrongylus Colubriformis*. *Am. J. Vet. Res.*, 19, (Oct., 1958): 918-920.]

Effect of Chlortetracycline on Liver Abscesses

In three experiments, chlortetracycline was fed continuously to fattening cattle at the rate of 70 mg. per animal per day. A total of 1,895 animals was used; 714 served as controls and 1,181 were given the antibiotic. In each experiment, the cattle given chlortetracycline developed significantly fewer liver abscesses than untreated cattle.—[Jean C. Flint and Rue Jensen: *The Effect of Chlortetracycline, Fed Continuously During Fattening, on the Incidence of Liver Abscesses in Beef Cattle*. *Am. J. Vet. Res.*, 19, (Oct., 1958): 830-832.]

BOOKS AND REPORTS

Doctor Squibb, the Life and Times of a Rugged Idealist

For more than 50 years, Dr. Squibb kept a handwritten journal of his daily life. The discovery of this diary makes an important addition to the primary sources available to historians of the nineteenth century. From before the Civil War to the last year of the century, this quarrelsome Quaker kept a detailed record of his wrangles with the United States Navy, with importers of adulterated drugs, with doctors and pharmacists all over the world.

From the thousands of pages in this diary, Dr.

Squibb's biographer has reconstructed the story of a founder of a great American corporation. He was crusader as well as a businessman. He was a Navy doctor who became a chemist in order to get pure drugs, and then became a medical journalist and politician in order to establish high standards of purity and uniformity in pharmacy. His biography is a highly readable and important part of the story of the making of modern America.—[*Doctor Squibb, the Life and Times of a Rugged Idealist*. By Laurence G. Blochman. 371 pages. Simon and Schuster, 630 5th Ave., New York 20, N. Y. 1958. Price \$5.00.]

Veterinary Notebook

"Veterinary Notebook" is a small volume of condensed information, written by a veterinarian with a wealth of experience in thoroughbred and purebred horse breeding. This book was written mainly for persons interested in or working on horse breeding farms. However, the practical information it contains is equally valuable to the practitioner dealing with breeding problems of horses.

The chapter entitled "New-Born Foals" includes a good description of the various infections encountered in foals and suggests an approach to therapy. There are also chapters entitled "Maiden Mares," "Barren Mares," "Stallions," "Foaling Mares," and "Unsoundness, Parasite Control and the Treatment of Wounds." Practitioners as well as veterinary students will gain many practical tips from this book.—[*Veterinary Notebook*. By Wm. R. McGee. 179 pages; illustrated. The Blood Horse, Lexington, Ky., 1958. Price \$6.50.]—P. J. MEGINNIS.

Tuberculosis in Animals and Man

This volume fills a need in the literature. Its primary objective is to provide a modern account of tuberculosis in all species on which there is reliable information. The book consists primarily of information compiled from a review of the literature and personal observations of the author.

The first seven chapters deal principally with bovine tuberculosis, methods of dissemination, lesions observed, diagnostic tests, immunization, and control. Reasons for nonspecific reactions in cattle are discussed. Skin tuberculosis, Johne's disease, avian and human tuberculosis are given as reasons for false reactions.

Chapter 8 deals with tuberculosis in animals other than cattle and is one of the most valuable parts of the book. The susceptibility of domestic animals, poultry, laboratory animals, a number of species of wild animals, and birds is discussed.

Chapter 9 gives a comparison of the pathological and epidemiological characteristics of tuberculosis in animals and man. The pathogenesis of each variety of *Mycobacterium tuberculosis* for various species of animals is discussed.

An appendix contains a list of "The Reports of

the British Royal Commission on Tuberculosis."

Occasional errors were noted; for example, a table on page 57 shows the dose of intradermic tuberculin used in the U.S.A. as 0.01 ml., when actually it should be 0.1 ml. The omission of chapter numbers in the table of contents should be corrected in the next edition.

The text is illustrated with 22 black and white plates which add much to the book.

This book should be useful for those engaged in research on Mycobacterium and for regulatory personnel engaged in tuberculosis testing and control work.—[*Tuberculosis in Animals and Man*. By John Francis. 357 pages; illustrated. Williams & Wilkins Co., Mount Royal Ave., Baltimore, Md., 1958. Price \$18.00.]—A. B. LARSEN.

Clinical Enzymology

Every veterinarian should own and study this book if he plans to keep abreast of medical and veterinary developments during the years ahead.

In the seven chapters, the editor and the authors have pointed out some striking and stimulating lines of progress. Intellectual hibernation—not organic brain deterioration—closes the door to new and profitable dreams, they say.

Clinical enzymology, they point out, is not a new science, but an old one that has been dusted off and shined up. For example, immunology is only indirect enzymology and the practice of administering antigens to induce antibody formation is one phase of clinical enzymology. In another phase, the application of plant brews or infusions to purulent wounds is an example of topical enzymatic debridement. In still a third direction, the ingestion of "ferments" to correct digestive disorders is an example of oral use of enzymes.

Diseases are manifestations of metabolic abnormalities, the book points out, and metabolic processes are regulated by enzymes. Medicinal chemistry, dealing as it does with pharmacology and chemotherapy, is essentially an aspect of selective toxicity—a means of achieving biological antagonism by resisting those agents which are foreign to the body while not interfering with metabolic and physiological processes. The entire area of medicine, in terms of pharmacology and chemotherapy, is an effort to adjust antagonistic forces essential to balanced function—which we call "health."

The chemistry of enzymes is the chemistry of protein, with the added property of the catalytic nature of these materials. Protein enzyme molecules possess both pharmacological and biochemical activities in striking degree. More than 100,000 different kinds of protein molecules are found in one human body, and many billions of units of each are present. The structure of each kind of protein is very complex, frequently consisting of a "seven-strand cable of seven-strand cables of molecules" to form the peptide sequences of amino acids. This complexity means that even molecules of the most carefully prepared protein from a single source will differ in molecular shape, weight,

configuration, solubility, and even biological activity.

This leads to a reclassification as biocatalysts, realizing that it is incorrect to regard as entities, distinct in all respects, what we have known as the antigens, the gene, the virus, and the peptide hormone. Each still retains, however, a relative specificity, a relative directional modifying power, and a relative target effect. All proteins can function as biocatalysts when found in the proper environment.

Enzymatic action is relative and antagonistic, and at least 20 enzymes have demonstrated the ability to induce antibody formation. The antigen-antibody reaction is parallel in all essential respects with the fertilization of egg by sperm, the invasion of bacterium by virus, a white cell phagocitizing a bacterium, or a parasite establishing itself in a host cell.

These and many specific applications for clinical use of trypsin for modifying permeability in inflammation and edema, of elastase and collagenase in degenerative affections of connective tissue, and of ribonuclease for liberating latent mitochondrial enzymes are discussed in a way to provide the biochemistry and physical chemistry on which treatment has been based, unknowingly and empirically. The treatments can, therefore, be used more specifically and more effectively when the technical information here presented reinforces the observational knowledge of the practitioner.—[*Clinical Enzymology*. Edited by Gustav J. Martin. 241 pages; 5 plates. Little, Brown & Co., Boston, Mass., and Toronto, Ont. 1958. Price \$6.00.]—R. C. KLUSSENDORF.

Meat Hygiene

Miller, in his preface to the second edition of "Meat Hygiene," states a fundamental principle of veterinary food inspection as it pertains to the health of the nation: "The routines that are applied in the packing plant, whether it is a meat packing plant or a poultry processing plant and that have for their purpose the applications of standards of common decency in the preparing and handling of meat food are similar to those that make it a safe food. Common decency and safety, nevertheless, have two separate and distinct objectives. In no case are the two to be confused one with the other, or one sacrificed for the other. Food must be prepared in a clean environment. It must be clean and free from contamination because that is the way the consumer wants it. It is no answer that unclean food can be made harmless by sterilization. On the other hand, even an esthetically acceptable method of handling food cannot be permitted to be used if the food as a result of that method of handling is unsafe when eaten."

It would be well for all veterinarians to study the definitions and aims of meat and poultry hygiene as given in this text.

In this second edition, there is complete coverage of poultry inspection and procedures. Additional material has been added to various chapters.

Three new chapters covering the subjects of "Food Poisoning," "Chemical Additives," and "Ionizing Radiation" have been added, which greatly increases its value to public health personnel.

This book should be in the library of every veterinarian and should be a required textbook for every veterinary student since it clearly and specifically outlines in easily readable style the mechanics and procedures for the inspection of meat foods used for human consumption. It includes the procedures and standards for meat hygiene garnered from almost 50 years of government inspection of meats.—[*Meat Hygiene*. By A. R. Miller. 557 pages; illustrated. 2nd ed. Lea and Febiger, 600 S. Washington Square, Philadelphia, Pa., May, 1958. Price \$8.50.]—F. R. KOUTZ.

Leptospirosis in Man and Animals

An appreciation of the content of this book can be best indicated by quoting the authors: "Our aim in this book has been to tell what is known about leptospirosis and the disease which they cause in man and animals, and to show where new knowledge is at present being gained." The authors have done a commendable job in reviewing the pertinent information on the pathogenic leptospirosis. This is attested to by the number of references (836) which originated from practically all areas of the world.

This book is divided into four sections: I—general characteristics of leptospirosis; II—leptospirosis in man; III—leptospirosis in animals; and IV—leptospirosis in regions most affected. Also included is a short appendix on culture mediums and laboratory techniques.

A rather unique chapter, which should be of interest to public health workers, is the one entitled, "Legal Aspects in England and Wales of the Contraction of Leptospirosis Diseases." Especially helpful to those who may want to pursue any given topic more thoroughly is the extreme care which has been taken to give full references for the statements made.

Unfortunately for veterinarians, the main emphasis in the book has been given to the disease in man. Although the references on leptospirosis in animals are adequate, the discussion of this topic is brief.

Without a doubt, this book represents the most complete compilation of information on leptospirosis that is available in the English language. For a number of years, research and an understanding of the prevalence and importance of this disease was handicapped because of a lack of dissemination of knowledge which had been obtained mainly by isolated groups of workers.

This book should be of special interest to epidemiologists, research workers in this field, and public health workers, and can be a useful reference book for physicians and veterinarians.—[*Leptospirosis in Man and Animals*. By J. M. Alston and J. C. Broom. 380 pages; 40 illustrations. Williams and Wilkins Co., Mt. Royal Ave., Baltimore, Md., 1958. Price \$8.50.]—E. H. BOHL.

THE NEWS

Veterinary School Enrollment 1958-1959

The number of students enrolled in the 19 schools of veterinary medicine in the United States and Canada is 46 less than the record number, 3,797, of a year ago. However this figure is 262 more than ten years ago (table 1).

Compared to the enrollment last year, this

TABLE 1—Student Enrollment by Decades 1938—1958

	1938-39	1948-49	1958-59
Alabama Polytechnic Institute	198	260	217
Colorado State University	144	227	263
Cornell University	160	186	210
Iowa State College	231	273	258
Kansas State College	239	273	275
Michigan State University	214	286	236
Ohio State University	227	286	273
Pennsylvania, University of	188	169	191
Quebec Veterinary School	53	73	100
Texas, A. & M. College of	287	279	223
Toronto, University of	259	494	203
Washington, State College of	139	186	187
Georgia, University of	•	153	235
Minnesota, University of	•	74	181
Missouri, University of	•	88	114
Tuskegee Institute	•	48	82
California, University of	•	42	202
Illinois, University of	•	24	147
Oklahoma State University	•	68	154
TOTAL	2,339	3,489	3,751

year's sophomore and junior classes are larger but there are 26 fewer freshmen and 40 fewer senior students (table 2). The number of veterinarians in graduate study is 18 more than a

TABLE 3—Veterinarians Engaged in Graduate Study

	1938-39	1948-49	1958-59
Alabama Polytechnic Institute	—	2	10
California, University of	—	—	14
Colorado State University	—	2	13
Cornell University	9	15	27
Georgia, University of	—	—	4
Illinois, University of	—	—	24
Iowa State College	7	9	21
Kansas State College	2	11	7
Michigan State University	6	35	41
Minnesota, University of	—	—	31
Missouri, University of	—	—	2
Ohio State University	9	10	20
Oklahoma State University	—	—	8
Pennsylvania, University of	—	—	—
Quebec Veterinary School	—	—	3
Texas, A. & M. College of	3	1	13
Toronto, University of	—	—	12
Tuskegee Institute	—	—	—
Washington, State College of	1	2	2
TOTAL	37	87	252

year ago and 165 more than ten years ago (table 3).

Of the 1,010 freshmen students, 56 percent had three or more years of preprofessional

TABLE 4—Preprofessional Training of First-Year Students

	3 Years	4 Years	5 Years or more
Number	256	201	89
Percentage	25.8	21.2	9.0

training (table 4) compared to 55 percent last year. There are 234 with bachelor degrees, 15 with master degrees, and one freshman has a Ph.D. degree. The 1,010 freshmen were selected from approximately 1,924 applicants as compared to 2,400 applicants last year; the first time

TABLE 2—Veterinary Student Enrollment for the Academic Year 1958—1959

Schools	Fresh.	Soph.	Jun.	Sen.	TOTAL		Change	Spec.	Grad.
					1958	1957			
Alabama Polytechnic Institute	60	60	46	51	217	232	-15	1	10
California, University of	53	52	46	51	202	200	+2	4	14
Colorado State University	67	63	64	69	263	261	+2	1	13
Cornell University	60	55	47	48	210	206	+4	3	27
Georgia, University of	62	57	62	34	235	242	-7	2	4
Illinois, University of	44	38	40	25	147	143	+4	6	24
Iowa State College	68	66	58	66	258	264	-6	—	21
Kansas State College	69	66	70	70	275	274	+1	4	7
Michigan State University	64	63	60	49	236	233	+3	13	41
Minnesota, University of	44	46	46	45	181	180	+1	—	31
Missouri, University of	30	26	29	29	114	118	-4	1	2
Ohio State University	72	72	62	67	273	273	0	—	20
Oklahoma State University	42	38	37	37	154	154	0	—	—
Pennsylvania, University of	57	49	43	42	191	191	0	—	—
Quebec Veterinary School*	29	19	32	20	100	97	+3	—	3
Texas, A. & M. College of	58	50	58	57	223	240	-17	2	13
Toronto, University of	58	53	44	48	203	209	-6	1	12
Tuskegee Institute	22	28	15	17	82	92	-10	—	—
Washington, State College of	51	48	47	41	187	188	-1	4	2
TOTAL	1,010	949	906	886	3,751	3,797	-46	42	252

*First year not included.

in many years that the ratio has been less than 1:2.

Of the 90 women students, 16 are seniors, 21 are juniors, 24 are sophomores, and 29 are freshmen. There were 95 women students last year.

Summary

Number of applicants	1,924
Number admitted	1,010
Number of students enrolled in 19 schools in U. S. and Canada: 3,751.	
United States	3,448
Canada	303
10 years ago: total	3,489
U. S.	2,992
Canada	367
20 years ago: total	2,339
U. S.	2,027
Canada	312
Class distribution of women: total	90
Freshmen	29
Sophomores	24
Juniors	21
Seniors	16
Academic degrees: total	250
B.S. 221	
BSA 2	
B.A. 11	
M.S. 14	
M.A. 1	
Ph.D. 1	

Veterinary Faculty Changes

The various changes in veterinary personnel in the faculties of 18 out of the 20 schools and colleges of veterinary medicine were reported as follows for the 1958-1959 school term (*New York State Veterinary College, Cornell University, and the College of Veterinary Medicine, Ohio State University, reported that no new appointments have been made since the last account of faculty changes appeared in the JOURNAL, Dec. 15, 1957, p. 578 and 581 respectively*):

Alabama, Alabama Polytechnic Institute

The following new members have been added to the faculty of the School of Veterinary Medicine at the Alabama Polytechnic Institute in Auburn: Drs. Benjamin F. Hoerlein (COL '43), head professor, Departments of Large and Small Animal Surgery & Medicine; Ralph E. Thorson (Johns Hopkins University '52), professor, Department of Pathology & Parasitology; Donald F. Walker (COL '44), associate professor, Department of Large Animal Surgery & Medicine; Albert N. Snelling (COR '31), assistant professor, Department of Bacteriology; Charles H. Woodley (API '57), instructor, Department of Physiology & Pharmacology; Jay M. Humburg (KSC '57), instructor, Department of Large Animal Surgery & Medicine; and Richard A. Arnold (KSC '58), instructor, Department of Anatomy & Histology.

DR. B. F. HOERLEIN HEADS DEPARTMENTS OF LARGE AND SMALL ANIMAL SURGERY & MEDICINE

AT A.P.I.—Dr. Benjamin F. Hoerlein (COL '43) assumed the duties of head professor of the Departments of Large and Small Animal Surgery & Medicine at the School of Veterinary Medicine, Alabama Polytechnic Institute, in April, 1958.

After graduation, Dr. Hoerlein entered the Army's Veterinary Corps where he rose to the



Dr. Benjamin F. Hoerlein

rank of major. In 1946, after his discharge, he did graduate work in bovine mastitis at Berkeley, Calif., going to Auburn as an assistant professor in January, 1948.

In September 1950, Dr. Hoerlein was granted a leave of absence to use an AVMA fellowship and complete his work on a Ph.D. at Cornell, concerning intervertebral disc protrusion. He returned to Auburn in June, 1952, as a full professor and was appointed director of the clinics in April.

Most of Dr. Hoerlein's later work has largely dealt with small animal surgery, spinal conditions, intervertebral disc protrusions, and soil treatment in the control of canine hookworms. He is author of more than 40 articles pertaining to these fields.

Dr. Hoerlein holds membership in Phi Kappa Phi, Phi Zeta, Alpha Psi, Alabama Veterinary Medical Association, American Society of Veterinary Radiologists, A.E.A., AVMA, and in the Education in Veterinary Biologic Science Society.

TUSKEGEE INSTITUTE.—Current additions to the staff of the School of Veterinary Medicine at Tuskegee Institute, Alabama, are as follows: Drs. Kermit O. Cockrell (TI '58), instructor, Department of Large Animal Medicine, Surgery & Clinics; Maxwell Henry (TI '54), instructor, Department of Pathology & Parasitology; Dean R. Hodges (TI '58), instructor, Small Animal Medicine, Surgery & Clinics; and Lorraine E. Smith (TI '57), instructor, Small Animal Medicine, Surgery & Clinics.

California, University of

New members of the faculty of the School of Veterinary Medicine at the University of California include: Drs. Christian Gibson Thin (Ph.D., Edinburgh University '52), lecturer and assistant biochemist in veterinary biochemistry; Murray Elwood Fowler (ISC '55), instructor and junior veterinarian, Department of Medicine and Surgery; Carl Edward Jacobsen (ISC '51), assistant specialist in avian medicine; and Robert Franklin Goodbary (MSC '58) and Robert James Luebke (COL '58), assistant specialists in medicine and surgery.

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Colorado State University

New faculty appointments at the College of Veterinary Medicine, Colorado State University, in Fort Collins are: Drs. Kenneth W. Smith (COL '32), professor, clinics and surgery; Henry E. Bredeck (Ph.D., MO '56), assistant professor, physiology; James J. Gilroy (Ph.D., Maryland '57), assistant professor, pathology and bacteriology; James E. Ogg (Ph.D., COR '50), assistant professor, pathology and bacteriology; Edward J. Carroll (COL '57), instructor, clinics and surgery; Eugene E. Flamboe (Ph.D., MSC '58), instructor, physiology; James A. Scott (COL '57), instructor, clinics and surgery; James L. Voss (COL '58), instructor, clinics and surgery; Charles A. Buchan (GA '58), temporary instructor, clinics and surgery; Wayne T. Slone (TEX '58), temporary instructor, clinics and surgery.

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Georgia, University of

The following veterinarians have been appointed to the faculty of the School of Veterinary Medicine at the University of Georgia, in Athens: Drs. Gordon L. Foy (GA '32), assistant professor, Department of Medicine & Surgery, Small Animal Division; Jack T. Tumlin (GA '53), assistant professor, Department of Microbiology & Preventive Medicine, poultry pathologist; John E. Kittrell (GA '58), instructor, Department of Medicine & Surgery, Small Animal Division.

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Illinois, University of

The following additions to the staff of the College of Veterinary Medicine at the University of Illinois have been made for 1958-1959: Drs. Jesse Ronald Pickard (KSC '45), assistant professor, veterinary extension, veterinary pathology & hygiene; Rajendra Chatteraj (Ph.D., Allahabad University '52), assistant, veterinary pathology & hygiene; Lloyd C. Helper (ILL '55), instructor, veterinary clinical medicine; and Erwin Small (ILL '57), instructor, veterinary clinical medicine.

Indiana, Purdue University

Newly appointed faculty members of the School of Veterinary Science and Medicine at Purdue University are: Drs. George C. Christensen (COR '49), professor and head, Department of Veterinary Anatomy; Terrence M. Curtin (MIN '54), assistant professor of veterinary science; Sayed M. Gaafar (TEX '55), assistant professor of veterinary science; Robert F. Cross (OSU '46), instructor of veterinary science; Raymond W. Loan (Wisconsin State University '58), instructor in veterinary science; David L. Madden (KSC '58), instructor in veterinary science; and Dee O. N. Taylor (COL '54), instructor in veterinary science.

DR. CHRISTENSEN HEADS DEPARTMENT OF ANATOMY AT PURDUE.—Dr. George C. Christensen (COR '49) has been appointed professor and head of the Department of Veterinary Anatomy at Purdue University.



Dr. George C. Christensen

In addition to the D.V.M. degree, Dr. Christensen also received his M.S. (1950) and Ph.D. (1953) degrees from Cornell University. He was an instructor at Cornell from 1949 to 1953. In 1953, he became associate professor of veterinary anatomy at Iowa State College.

Dr. Christensen is the author of numerous publications dealing with the urogenital system, blood circulation, and the history of veterinary education. His current investigation of the coronary circulation in all domestic animals is sponsored by the National Institutes of Health, U. S. Public Health Service.

He holds membership in the AVMA, the American Association of Anatomists, the American Association of the History of Medicine, the Biological Photographers Association, as well as in other scientific and honorary societies.

Iowa State College

New appointments to the faculty of the Division of Veterinary Medicine at Iowa State College are as follows: Drs. Erskine V. Morse (COR '44), professor and associate director, Veterinary Medical Research Institute; Ralph W. Mohri (KSC '29), associate professor, Department of Veterinary Hygiene; Frederick C. Neal, Jr. (TEX '44), assistant professor, Department of Medicine & Surgery; Kenneth S. Preston (ISC '40), assistant professor, Department of Medicine & Surgery and in charge of ambulatory clinics; James A. Fernier (ISC '52), instructor, Department of Veterinary Anatomy; Lowell N. Brown (OSU '58), instructor, Department of Veterinary Hygiene; John C. Peckham (OKL '58), instructor, veterinary diagnostic laboratory; Keith R. Rhoades (KSC '58), instructor, veterinary diagnostic laboratory; Ward R. Richter (ISC '55), instructor, Department of Veterinary Pathology; Richard B. Talbot (KSC '54), instructor, Department of Veterinary Physiology & Pharmacology.

Dr. E. V. Morse, Professor & Associate Director of the Veterinary Medical Research Institute, at I.S.C.—Succeeding Dr. H. E. Biester (UP '19), who has retired from the Institute, Dr. Erskine V. Morse assumed administrative duties as professor and associate director of the Veterinary Medical Research Institute at Iowa State College on July 1, 1958.



Dr. Erskine V. Morse

Born in Peoria, Ill., Dr. Morse graduated from Cornell University in 1944 and received his M.S. degree in 1948 and his Ph. D. degree in 1949 from Cornell. He majored in veterinary bacteriology with minors in biochemistry and physiology.

Serving in the armed forces from 1944 to 1947, Dr. Morse has held the following subsequent posi-

tions: graduate assistant in veterinary bacteriology at Cornell; assistant professor and associate professor in veterinary science at the University of Wisconsin; and associate professor in microbiology & public health at Michigan State University.

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Kansas State College

Following is a list of the new appointments to the faculty of the School of Veterinary Medicine at Kansas State College: Drs. Donald C. Kelley (KSC '35), associate professor, Department of Pathology; Lennart P. Krook (Sweden '57), associate professor, Department of Pathology; Brian C. Cummings (KSC '57), instructor, Department of Anatomy; and Gerald D. Rousseau (KSC '58), instructor, Department of Physiology.

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Michigan State University

The College of Veterinary Medicine at Michigan State University in East Lansing made only one full-time permanent faculty appointment since last year's report: Dr. W. V. Lumb (KSC '43), associate professor, Department of Surgery & Medicine.

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Minnesota, University of

Additions to the staff of the College of Veterinary Medicine at the University of Minnesota, in St. Paul, are as follows: Drs. William F. Cates (MIN '54), instructor, Division of Veterinary Obstetrics; and Darrel D. Joel (MIN '58), instructor, Division of Veterinary Pathology & Parasitology.

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Missouri, University of

Only one additional faculty member has been added to the School of Veterinary Medicine at the University of Missouri, Columbia, since last year: Dr. Theodore A. Farmer (COL '50), assistant professor, veterinary medicine and surgery.

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Oklahoma State University

The new veterinarians on the staff of the College of Veterinary Medicine, Oklahoma State University are: Drs. Bruce S. Blauch (UP '56), instructor of veterinary medicine and surgery; Malcolm H. Crump (GA '58), instructor of veterinary anatomy; Charles D. Heinze (KSC '53), instructor of veterinary medicine and surgery; and David A. Schoneweis (KSC '56), instructor of veterinary medicine and surgery.

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Ontario, University of Toronto

Recent appointments to the faculty of the Ontario Veterinary College, University of Toronto, include: Drs. J.I. Raeside (M.S. and

Ph.D.), associate professor, Department of Physiological Sciences; M. Savan (ONT '45), associate professor, Department of Pathology & Bacteriology; G.A. Robinson (M.Sc. and Ph.D.), assistant professor, Department of Physiological Sciences; O.W. Sack (ONT '57), assistant professor, Department of Anatomy; S.D. Vesseliovitch (Belgrade '49), assistant professor, Department of Medicine & Surgery; R.B. Miller (ONT '58), lecturer, Department of Medicine & Surgery; J.D. Mongeau (QUE '56), lecturer, Department of Pathology & Bacteriology; J.H. Reed (ONT '55), lecturer, Department of Medicine & Surgery; and A.M. Luft, assistant, Department of Physiological Sciences.

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Pennsylvania, University of

New appointments in the School of Veterinary Medicine at the University of Pennsylvania are as follows: Drs. Robert M. Sauer (UP '52), associate on pathology; Herbert F. Schryver (COR '54), instructor in veterinary pathology; Donald F. Patterson (OKL '54), instructor in veterinary medicine; Charles Middleton (MO '58), instructor in veterinary surgery; Matthew P. Mackay-Smith (GA '58), instructor in veterinary surgery; Walter W. Cole (COL '58), instructor in veterinary medicine; Gilbert C. Fischer (ILL '56), assistant instructor in physiology and pharmacology.

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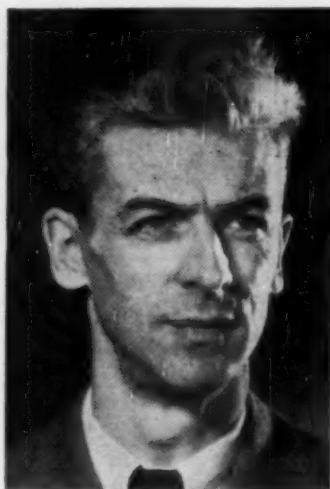
Quebec, University of Montreal

The following three new appointments have been made at the School of Veterinary Medicine affiliated with the University of Montreal, in Saint Hyacinthe: Drs. Paul Genest (MON '36), head, Department of Microbiology & Virology; Dr. Rene Veilleux (MON '55); and Mr. Romain David (Institute Meurice, Belgium), professor of chemistry and physics.

DR. P. GENEST HEADS DEPARTMENT OF MICROBIOLOGY & VIROLOGY.—Born in Montreal in 1911, Dr. Genest received his D.V.M. degree from the University of Montreal in 1936 and took post-graduate training from 1937 to 1938 at McGill University while holding the position of assistant professor in bacteriology and pathology from 1936 to 1941.

In 1942, Dr. Genest was attached to the laboratory of the Quebec Veterinary Service while studying for his Ph. D. degree which he received from Laval University in 1947. He was appointed head of the research and diagnostic laboratory at St. Hyacinthe in 1948.

Past-president of the Society of Microbiology of the Province of Quebec, chairman of the committee on cultural and scientific relations of the Quebec Veterinary Association, a member of many scientific and social organizations, and lec-



Dr. Paul Genest

turer at the School of Hygiene at the University of Montreal, Dr. Genest has also published several papers on microbiology, infectious diseases, pathology, and pharmacology.

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Texas, A. & M. College of

The new changes in personnel at the School of Veterinary Medicine at the A. & M. College of Texas include the following: Drs. Edgar D. McMurray (TEX '51), assistant to the dean; M. R. Calliham (TEX '49), professor and head, Department of Veterinary Medicine & Surgery; C.I. Boyer (UP '40), assistant professor, Department of Microbiology; J.H. Denton (TEX '45), assistant professor, ambulatory clinician, Department of Veterinary Medicine & Surgery; E.W. Ellett (GA '53), assistant professor, small animal clinic, Department of Veterinary Medicine & Surgery; R.W. Moore (TEX '55), assistant professor, veterinary microbiology; T. J. Galvin (TEX '57), instructor, veterinary parasitology; J.D. McGrady (TEX '58), instructor, veterinary physiology and pharmacology; J. F. Neal (KSC '50), instructor, veterinary medicine and surgery; R. D. Stephenson (OKL '56), instructor, veterinary microbiology; and J.B. Henson (TEX '58), assistant veterinarian, substation #3, Texas Agricultural Experiment Station.

DR. M. R. CALLIHAM HEADS DEPARTMENT OF VETERINARY MEDICINE AND SURGERY AT A. & M. COLLEGE OF TEXAS.—Dr. M.R. Calliham, former head of the Department of Agriculture at West Texas State College, joined the staff of the School of Veterinary Medicine at the A. & M. College of Texas on Sept. 1, 1958, as head of the Department

of Veterinary Medicine & Surgery. He succeeds Dr. C.W. Schulz who accepted employment with a commercial firm last August.



Dr. Melvin R. Calliham

Dr. Calliham attended public schools in Conway, Texas. He received his B.S. degree in animal husbandry in 1941 at the A. & M. College of Texas where he was a member of the International Livestock Judging Team.

From June, 1941, to March, 1946, Dr. Calliham was in the U.S. Army where he advanced to the grade of major prior to entrance into the School of Veterinary Medicine at the A. & M. College of Texas. He graduated from there in 1949.

After a time in private practice, Dr. Calliham joined the staff of the Texas Agricultural Experiment Station as an associate veterinarian and did research work at the Pan-Tech Station near Amarillo. In 1952, he joined the faculty of the West Texas State College as head of the Department of Agriculture.

Dr. Calliham has had several honors during his professional career. He has been active in professional affairs of his local, state, and national associations. He is a member of the AVMA, the Panhandle and Texas associations, as well as the American Society of Animal Production. He has served as a member of the board of directors of the Texas V.M.A. and as secretary of its executive committee. Dr. Calliham is also executive secretary of the American Beef Cattle Performance Registry Association, an organization interested in the inherited ability of beef cattle to make profitable gains.

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Washington, State College of

The following addition to the staff of the College of Veterinary Medicine, State College of Washington, Pullman, has been made: Dr. Leslie P. Williams (COL '55), instructor, Department of Clinical Medicine & Surgery.

W.I.C.H.E. Makes Veterinary Medical Study

A report dealing with the manpower situation in veterinary medicine and with educational facilities for the profession was published recently by the Western Interstate Commission for Higher Education in Boulder, Colo.

Predicting that by 1965 there will be approximately 4,500 veterinarians practicing in the West, compared with the 3,000 in practice today, the report further stated that the Western schools of veterinary medicine have educated slightly over half of the veterinarians now practicing in the West.

At present, the three Western schools are graduating approximately 150 veterinarians each year. The largest proportion of students enrolled in these schools comes from the state in which the school is located. The report found that there are from 35 to 50 spaces in these schools for Western freshmen from states without veterinary medical facilities.

Reviewed by an advisory committee, the report carried the following recommendations: a strengthening of graduate programs to increase the number of veterinarians engaged in teaching and research; a complimentary specialization among the three schools of veterinary medicine; an expansion of the W.I.C.H.E. student exchange program; and a recommendation that no new schools of veterinary medicine be created in the West, but rather, that some expansion of the three existing schools be planned.—*Higher Educ. in the West*, 5 (July, 1958).

World Veterinary Association Proposed

At its meeting in Paris, May 22, 1958, the Permanent Committee of the International Veterinary Congresses discussed a proposal that, in the future, these conventions be called "World Veterinary Congresses" and that the organization built up in connection with these Congresses be called the "World Veterinary Association."

The reason for changing the name from "international" to "world" is that many congresses representing only two or three countries are called "international." The membership will consist of national organizations, not of individual veterinarians. The first International Veterinary Congress was held in 1863. In 1906, a Permanent Committee representing 39 member countries was established to act between congresses.

During the 95 years, since the first I.V.C., many activities have been organized on a world basis. Much has been accomplished regarding nomenclature of diseases, cataloging veterinary films, etc. It has also been suggested that this World Veterinary Association be responsible for the publication of a journal.

It is of interest that for the last ten years there has been a World Medical Association which has grown into a large and influential body, with a Secretariat in New York. Among its many activities, it publishes a bimonthly journal.



Going to Madrid for the XVth I.V.C.
May 21-27, 1959



Left—statues of Don Quixote and Pancho, a memorial to Cervantes, in Spain Square, Madrid.
Center—The picturesque Plaza de Calaluña in Barcelona.
Right—The charming plaza for promenade, Plaza de America, in Seville.

Pictured above are three of the sights which participants in the XVth International Veterinary Congress, to be held in Madrid, Spain, May 21-27, 1959, will see if they take one of the tours offered by the U.S. Committee.

Those who want additional information about the Congress and the tours may write to the U.S. Committee XVth, 600 S. Michigan Ave., Chicago 5, Ill., c/o AVMA (see the JOURNALS: June 1, 1958, p. 500; Sept. 1, 1958, p. 282; Oct. 15, 1958, p. 441).

AMONG THE STATES AND PROVINCES

California

Women's Auxiliary.—The Women's Auxiliary to the Southern California V.M.A. held a brunch and "Sunday Promenade" at the Beverly Hilton Hotel in Los Angeles on October 5, with the proceeds of the benefit going to the San Rafael Guide Dogs for the Blind, Inc.

Mrs. Donald McDole, Los Angeles, presided at the brunch and Mrs. Howard Taylor, also of Los Angeles, was general chairman of the event. Providing guide dogs for the blind is the year-round goal of the auxiliary.

s/ELAINE L. PUTNEY, Publicity Chairman.

Florida

Dr. Thomas Chosen as Veterinarian of the Year by State Association.—The Florida State V.M.A. at a recent meeting held in Fort

Lauderdale chose Dr. E. Fred Thomas (GA '26) of Sarasota as the "Veterinarian of the Year". This is the highest honor that the Association can bestow upon any veterinarian in recognition of meritorious service in the field of veterinary medicine.

Beginning his veterinary career in Florida in 1927, Dr. Thomas accepted a position as pathologist in the Department of Veterinary Science at the University of Florida in Gainesville. He resigned in 1933 to enter into private practice.

In 1949, he became head of clinical veterinary medicine at the University of Georgia. Dr. Thomas resigned from the faculty there in 1952 and returned to Florida where he again went into private practice. In 1953, he moved from Jacksonville to Sarasota and opened the Thomas Animal Hospital.

Dr. Thomas is past-president of the Florida State V.M.A., a member of the Southern V.M.A., the AVMA, and the American Animal Hospital Association.

s/A. L. SHEALY, Correspondent.

New York

Dr. MacKellar, Sr., Selected as Chairman of the Veterinarians' Division in N. Y.'s March of Dimes Campaign.—Dr. Robert S. MacKellar, Sr., (NYC '94), of the Greenwich Village Dog & Cat Hospital, 329 W. Twelfth St., has been appointed chairman of the Veterinarians' Division of the state's 1959 March of Dimes campaign. Mr. Roy W. Moore, Sr., general chairman of the 1959 N.Y. March of Dimes drive, announced the appointment November 6.



Dr. E. Fred Thomas



Virginia

At Virginia's State Fair, the Atlantic Rural Exposition, the Virginia V.M.A. assembled a booth, shown at left, to illustrate graphically the veterinarians' part in today's living. One half of the exhibit was devoted to simulated small animal surgery; the other half dealt with veterinarians in action and to a display of antique instruments. Approximately 500,000 people visited the fair in which more than 15,000 brochures were distributed emphasizing veterinary services.

DEATHS

Star indicates member of AVMA

★**Gerald J. Beebe** (MSC '43), 41, Paw Paw, Mich., died on Sept. 28, 1958.

Geoffrey A. Boyd (COL '20), 63, Sacramento, Calif., retired chief of the state's Bureau of Meat Inspection, died Oct. 2, 1958, at the veterans' hospital in Oakland. He had retired from his post on September 18.

Dr. Boyd entered state service in 1927 as a veterinary meat inspector, and later served as livestock inspector. From 1933 to 1936, he worked with dairymen to help stop the spread of tuberculosis in the Eureka area. Dr. Boyd served as chief of meat inspection of the entire San Francisco bay area until 1941 when the state legislature created the first Bureau of Meat Inspection.

Leroy L. Cress (ONT '04), 81, Clinton, Mo., died in his home Sept. 18, 1958, following an illness of several years duration. He had practiced in Clinton for almost 50 years.

★**John R. Cunningham** (ONT '15), 71, Summerside, P.E.I., Can., died Sept. 12, 1958, after suffering a heart attack.

Dr. Cunningham received his B.V.Sc. degree from the Ontario Veterinary College in 1915 and his M.R.C.V.S. degree from the Royal College of Veterinary Surgeons, Edinburgh, in 1921. He was a member of the P.E.I. Veterinary Medical Association, and the National Veterinary Medical Association of Great Britain and Ireland.

John W. Edge, 76, Tallahassee, Fla., died Oct. 3, 1958, after a long illness.

A native of Seale, Ala., Dr. Edge was retired from practice at the time of his death. He is

survived by his widow, Allie Fulgham Edge, one niece, and a nephew.

Elmer V. Edmonds (WSC '11), 70, Oakland, Calif. (formerly a resident of Mt. Vernon, Wash.), died in an Oakland hospital on Sept. 8, 1958.

Upon graduation, Dr. Edmonds set up practice with Dr. C. S. Phillips in Mount Vernon. He left there about 35 years ago and became a commercial artist in California.

Dr. Edmonds' widow, Mrs. Frieda Edmonds, two sons, and three sisters survive.

★**Merrill Goodman** (COR '43), 40, Washingtonville, N. Y., died in St. Luke's Hospital, Oct. 3, 1958, after a long illness.

Dr. Goodman served one year of apprenticeship with Dr. L. L. Parker at Catskill, N. Y., and then opened his own practice in Washingtonville in 1945.

A past-president of the Board of Trade and the Parent-Teacher Association of Washingtonville, Dr. Goodman was also president-elect of the Hudson Valley V.M.A. He was a member of the New York City and New York State veterinary societies, the Orange County Sanitation Association, and the Orange County Farm Extension Bureau.

In April of this year, Dr. Douglas F. McBride (COR '55) became associated with Dr. Goodman and he will continue the practice. Dr. Goodman is survived by his widow, Mrs. Isabel Bonn Goodman, two sons, one daughter, one sister, and one brother.

★**Emil E. Grinstead** (WSC '32), 50, Everett, Wash., died June 1, 1958. He had undergone an amputation of the left shoulder at Mayo Clinic last January.

Dr. Grinstead was affiliated with the XIIth International Veterinary Congress and with Alpha Psi. He is survived by his widow, Josephine Plesha Grinstead.

Fred Gross (STJ '17), Omaha, Neb., died Sept. 29, 1958. He had made his home in Omaha since moving from St. Joseph, Mo., 15 years ago. Dr. Gross was a native of Leavenworth, Kan.

Gaynor W. Henry (GA '50), 42, Memphis, Tenn., died on Oct. 14, 1958, as the result of injuries received following an unexplained attack in his hospital office. He suffered extensive skull fractures and brain damage. Robbery was considered to be the motive.

Born in Conyers, Ga., May 6, 1916, Dr. Henry located for a time in Newport, Tenn., following graduation. He established his hospital clinic in Memphis about five years ago. Dr. Henry was unmarried.

Robert I. Kilpatrick (KCV '12), 83, Media-polis, Iowa, died Sept. 12, 1958, at Burlington Hospital, after an illness of several months.

Dr. Kilpatrick remained active in his profession until 1957. He was an honorary life member of the Iowa V.M.A. as well as a member of the Southwestern and Eastern Iowa associations.

Surviving Dr. Kilpatrick are two sons: one of whom is a veterinarian, Warren J. (ISC '49); three sisters and two brothers.

James E. Shelton (STJ '08), 87, Balsam Lake, Wis., died Sept. 10, 1958, after an extended illness. At the time of his death, he resided at the home of one of his daughters, Mrs. William A. Ramsey.

Dr. Shelton was born in El Monte, Calif., and received his preliminary education at North Texas State Teachers College in Denton, Texas. During the years 1908 to 1941, he was in charge of meat inspection at Fort Worth, Amarillo, Arkansas City, and Denver. He retired in April, 1941, at Denver.

Beside the daughter with whom he resided, one other daughter, two brothers, and three grandchildren survive.

Earl Sunderville (COR '08), 72, Ithaca, N.Y., former professor of anatomy at New York State Veterinary College and emeritus professor since 1949, died on Nov. 4, 1958.

Born at Newark, N.Y., on Oct. 5, 1886, he joined the veterinary faculty immediately after graduation and was associated with the anatomy department throughout his lifetime, first as an assistant, then as an instructor, assistant professor, and professor. He served as a professor from 1934 to 1949.

Dr. Sunderville's special interests included the lymphatic system of cattle, postmortem anatomy of chickens, and the tonsils of the dog. He was a member of the AVMA from 1913 to 1945. Funeral services were held in Ithaca on November 7, with interment at Newark.

James Richard Tremlett (COR '23), 60, Natural Dam, N.Y. (formerly of Gouverneur, N.Y.), died at his home Sept. 7, 1958.

After graduation, Dr. Tremlett practiced with Dr. Baker in Gouverneur and in 1925 he went into practice for himself. Dr. Tremlett did work for the pioneer division of the Borden Company, the N.Y. State Department of Agriculture, and the U.S.D.A. In March, 1958, he sold his practice to Dr. David E. Harling (COR '55) and moved to Natural Dam.

Dr. Tremlett was a member of the Gouverneur Luncheon Club, former president of the Gouverneur Country Club, a member of Gouverneur Lodge 217, A.F. & A.M., Gouverneur Chamber of Commerce, and of the St. Lawrence County Veterinary Society, among many others.

He is survived by his widow, Mrs. Marjorie Tremlett, two sons, a daughter, two brothers, and three sisters.

Jacob Van Price, approximately 85, West Bend, Wis., (formerly of Norwood, Wis.) died Oct. 4, 1958. He had resided in the home of a nephew, James, in West Bend.

Born in Holland, Dr. Van Price came to this country with his parents when he was three years old. Surviving are a sister and three brothers.

• • •

Other Deaths Reported.—The following deaths have been reported. The usual information for an obituary was not supplied.

Norman C. Bullock, Sept. 2, 1958.

Harry J. Cairns, Waco, Texas, died Jan. 18, 1958.

William C. Caldwell (KCV '15), Laurinburg, N. Car., died March 5, 1958.

O. A. Christian, Wetaskiwin, Alta., died July 20, 1958.

Ashley J. Joyner (KCV '16), Gulfport, Miss., died Aug. 8, 1958.

Rudolfs Mance, Seattle, Wash., died July 10, 1958.

★George C. Melody (USC '16), 74, Greensburg, Pa., died Oct. 18, 1958.

August J. Pittman (KCV '11), Troy, Mo., died April 9, 1958.

Earl J. Powers, Winston-Salem, N. Car., died Sept. 21, 1958.

James M. Stevens (ONT '50), Kemptonville, Ont., died Aug. 31, 1958.

★Bremner B. White, (KSC '20), 60, Sacramento, Calif., died Aug. 1, 1958.

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Secretary—Mrs. A. W. Eivers, 1745 S. 13th St., Salem, Ore.

Your Dollar: What it Buys in the AVMA Auxiliary.—Did you know that your dues dollar buys a membership in the oldest auxiliary of the related professions? The Women's Auxiliary to the AVMA is older than either the medical or dental auxiliaries. In 1917, interested women who went to conventions with their veterinarian husbands saw the need of an organized group which would help to further the interests of the profession, and it is with this purpose in mind that the auxiliary members have been working for the past 41 years.

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Your dollar will also help to provide one annual student loan of \$500. Since \$250 was contributed to the AVMA Research Fund, part of your dollar will go to help provide funds for further research in the veterinary field; and a fraction of a cent will go toward assisting the International Auxiliary to the Veterinary Profession.

To encourage and show our interest in future members, a few cents of your dues will be used to publish three student auxiliary newsletters. Letters relating activities of the student auxiliaries are compiled and edited by the first vice-president and sent to each group. In conjunction with this project, a six months' complimentary membership to the AVMA Auxiliary is granted to each wife of a graduating senior veterinary student; this membership is provided by a portion of your dollar.

In cooperation with the AVMA public relations program, a few pennies will take care of the expenses of the Public Relations Committee set up by the AVMA Auxiliary.

Each year, the president of the Auxiliary is allotted a certain sum of money for traveling expenses. By invitation from the affiliated auxiliaries, she attends as many meetings as time and money will allow, thus strengthening the bonds of our organization by the close contact of a national officer.

Every year, the "Proceedings of the Business Sessions" and the "Report of Officers" is sent to each affiliate auxiliary, acquainting all members with the pertinent business as it has transpired.

To personally keep you up-to-date on the activities of the AVMA Auxiliary and the affiliate auxiliaries, a few more pennies of your dollar provides you each April with the *Auxiliary News*, the yearly publication of the organization.

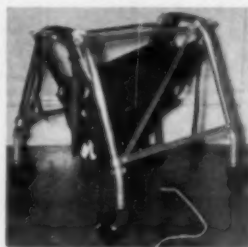
In order to keep the auxiliary functioning, a part of your dollar is used for administration, processing memberships, annual meeting costs, and such other items that may come up to keep the organization functioning smoothly.

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S/(Mrs. J. D.) KATHRO STEVENS, *Treasurer.*

Penicillin in Market Milk.—In a survey of milk marketed in a Massachusetts town in the summer of 1957, 15 (12.3%) of 122 pasteurized milk samples were positive for penicillin.—*J. Milk & Food Technol. (Aug., 1958): 211.*

Fuller's Earth for Oil-Soaked Birds.—Fuller's earth, used chiefly as a filter and a catalyst in chemical reactions, can save the lives of oil-soaked birds. The oil has a tendency to mat the feathers and prevent flight. Removing it with soap and water also removes natural oil so that the bird will sink if it attempts to swim; also it is more susceptible to pneumonia. About two weeks is required for the glands to secrete enough oil to again protect the bird.—*Sci. News Letter (May 17, 1958): 312.*



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COMING MEETINGS

American Association of Equine Practitioners. Annual meeting. LaSalle Hotel, Chicago, Ill., Dec. 15-16, 1958. M. L. Scott, 42 W. Market St., Akron 2, Ohio, secretary-treasurer.

New York Academy of Sciences. Conference on genetics of streptomycetes and other antibiotic-producing microorganisms. Barbizon-Plaza Hotel, 101 West 58th St., at 6th Ave., N.Y., Jan. 6, 1959. Wacław Szybalski, Rutgers University, New Brunswick, N.J., chairman.

Cornell University. Fifty-first annual conference for veterinarians. New York State Veterinary College, Ithaca, Jan. 7-9, 1958. W. A. Hagan, dean.

Southern California Veterinary Medical Association. Annual meeting. Beverly Hilton Hotel, Beverly Hills, Jan. 10, 1959. R. J. Schroeder, 1919 Wilshire Blvd., Los Angeles, Calif., program chairman.

Tennessee Veterinary Medical Association. Annual meeting. Noel Hotel, Nashville, Jan. 11-13, 1959. H. W. Hayes, 5009 Clinton Pike, Knoxville, secretary-treasurer.

Kansas Veterinary Medical Association. Fifty-fifth annual convention. Hotel Broadview, Wichita, Kan., Jan. 13-15, 1959. Dr. Maynard Curtis, 5236 Delmar Ave., Kansas City 3, Kan., secretary.

Indiana Veterinary Medical Association. Annual meeting. Noel Hotel, Indianapolis, Ind., Jan. 14-16, 1959. George R. Burch, program chairman.

Iowa Veterinary Medical Association. Annual meeting. Hotel Fort Des Moines, Iowa, Jan. 20-22, 1959. F. B. Young, executive secretary.

Michigan State University. Thirty-sixth annual postgraduate conference for veterinarians. College of Veterinary Medicine, Michigan State University, East Lansing, Mich., Jan. 21-22, 1959. W. W. Armistead, dean.

Intermountain Veterinary Medical Association. Annual convention. Hotel Utah, Salt Lake City, Jan. 22-24, 1958. Douglas R. McKelvie, correspondent.

Oklahoma Veterinary Medical Association. Annual meeting. Mayo Hotel, Tulsa, Jan. 25-27, 1959. M. N. Riemen-schneider, 122 State Capitol Bldg., Oklahoma City, secretary.

Minnesota State Veterinary Medical Society. Annual meeting. Leamington Hotel, Minneapolis, Jan. 26-28, 1959. B.S. Pomeroy, University of Minnesota, College of Veterinary Medicine, St. Paul 1, Minn. secretary-treasurer.

Louisiana State University. Annual conference. Pleasant Hill, Louisiana State University Campus, Jan. 27-28, 1959. William T. Oglesby, correspondent.

Maryland State Veterinary Medical Association. Winter meeting. Emerson Hotel, Baltimore, Md., Jan. 27-28, 1959. Harry L. Schultz, Jr., secretary-treasurer.

California Veterinary Medical Association. Midwinter conference. School of Veterinary Medicine, University of California, Davis, Feb. 2-4, 1959. John W. Kendrick, conference chairman.

Ohio State Veterinary Medical Association. Annual convention. Neil House Hotel, Columbus, Feb. 4-6, 1959. Harry C. Sharp, 1411 W. Third Ave., Columbus, Ohio, executive secretary.

Oregon Veterinary Medical Association. Winter meeting. Multnomah Hotel, Portland, Feb. 6-7, 1959. O. H. Muth, secretary-treasurer.

Illinois State Veterinary Medical Association. Annual meeting. LaSalle Hotel, Chicago, Feb. 16-18, 1959. C. B. Hostetler, 1385 Whitcomb Ave., Des Plaines, executive secretary.

Third Pan American Congress of Veterinary Medicine and Ninety-Sixth Annual Meeting, American Veterinary Medical Association. Joint meeting. Kansas City, Mo., Aug. 23-27, 1959. H. E. Kingman, Jr., executive-secretary, AVMA, 600 S. Michigan Ave., Chicago 5, Ill. B. D. Blood, secretary-general, Directing Council, Pan American Congress of Veterinary Medicine, P.O. Box 99, Arul, F.C.N.G.R., Argentina, S.A.

Foreign Meetings

International Veterinary Congress. Sixteenth session. Madrid, Spain, May 21-27, 1959. Prof. Pedro Carda A., general secretary, Calle Villanueva 11, Madrid.

U.S. COMMITTEE: Dr. W. A. Hagan, chairman, New York State Veterinary College, Ithaca, N. Y.; Dr. J. G. Hardenbergh, secretary, 600 S. Michigan Ave., Chicago 5, Ill.

Third World Congress on Fertility and Sterility. Amsterdam, Holland, June 7-13, 1959. Dr. L. I. Swaab, Sint Agnietenstraat 4, Amsterdam, Holland, honorary secretary.

Regularly Scheduled Meetings

ALABAMA—Central Alabama Veterinary Association, the first Thursday of each month. Dr. G. W. Jones, Main St., Prattville, Ala., secretary-treasurer.

Jefferson County Veterinary Medical Association, the second Thursday of each month. S. A. Price, 213 N. 15th St., Birmingham, secretary.

Mobile-Baldwin Veterinary Medical Association, the third Tuesday of each month. W. David Gross, 771 Holcombe Ave., Mobile, Ala., secretary.

North Alabama Veterinary Medical Association, the second Thursday of November, January, March, May, July, and September, in Decatur, Ala. Ray A. Ashwander, Decatur, Ala., secretary.

North East Alabama Veterinary Medical Association, the second Tuesday of every other month. Leonard J. Hill, P.O. Box 761, Gadsden, Ala., secretary-treasurer.

ARIZONA—Central Arizona Veterinary Medical Association, the second Tuesday of each month. Keith T. Maddy, Phoenix, Ariz., secretary.

Southern Arizona Veterinary Medical Association, the third Wednesday of each month at 7:30 p.m. E. T. Anderson, Rt. 2 Box 697, Tucson, Ariz., secretary.

ARKANSAS—Pulaski County Veterinary Medical Society, the second Tuesday of each month. Harvie R. Ellis, 54 Belmont Drive, Little Rock, Ark., secretary-treasurer.

(Continued on adv. p. 32)

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CALIFORNIA—Alameda-Contra Costa Veterinary Medical Association, the fourth Wednesday of Jan., March, May, June, Aug., Oct., and Nov. Leo Goldston, 3793 Broadway, Oakland 11, Calif., secretary.

Bay Counties Veterinary Medical Association, the second Tuesday of February, April, July, September, and December. Herb Warren, 3004 16 St., San Francisco, Calif., executive secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. R. B. Barsaleau, 2333 E. Mineral King, Visalia, Calif., secretary.

Kern County Veterinary Medical Association, the first Thursday evening of each month. James L. Frederickson, 17 Niles St., Bakersfield, Calif., secretary-treasurer.

Mid-Coast Veterinary Medical Association, the first Thursday of every even month. W. H. Rockey, P. O. Box 121, San Luis Obispo, Calif., secretary.

Monterey Bay Area Veterinary Medical Association, the third Wednesday of each month. Lewis J. Campbell, 90 Corral de Tierra, Salinas, Calif., secretary.

North San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month at the Hotel Covell, in Modesto, Calif. Lyle A. Baker, Turlock, Calif., secretary.

Orange Belt Veterinary Medical Association, the second Monday of each month. Chester A. Maeda, 766 E. Highland Ave., San Bernardino, Calif., secretary.

Orange County Veterinary Medical Association, the third Thursday of each month. Donald E. Lind, 2643-N. Main St., Santa Ana, Calif., secretary.

Peninsula Veterinary Medical Association, the third Monday of each month. R. M. Granfield, 2600 W. El Camino Real, San Mateo, Calif., secretary-treasurer.

Redwood Empire Veterinary Medical Association, the third Thursday of each month. Robert L. Chandler, P.O. Box 8, Ukiah, Calif., secretary.

Sacramento Valley Veterinary Medical Association, the second Wednesday of each month. W. E. Steinmetz, 4227 Freeport Blvd., Sacramento, Calif., secretary.

San Diego County Veterinary Medical Association, the fourth Tuesday of each month. H. R. Rosoll, 1795 Moore St., San Diego, Calif., secretary.

San Fernando Valley Chapter SCVMA, the second Tuesday of each month at 7:30 p.m., Hody's Restaurant, North Hollywood, Calif. Dr. V. H. Austin, 14931 Oxnard St., Van Nuys, secretary-treasurer.

San Fernando Valley Veterinary Medical Association, the second Friday of each month at the Casa Escoba Restaurant in Studio City. Dr. Rolf Reese, 23815 Ventura Blvd., Calabasas, Calif., secretary.

Santa Clara Valley Veterinary Association, the fourth Tuesday of each month. Kay Beulley, N. Fourth and Gish Rd., San Jose, Calif., secretary.

Southern California Veterinary Medical Association, the last Wednesday of each month. Don Mahan, 1919 Wilshire Blvd., Los Angeles 37, Calif., executive secretary.

Tulare County Veterinary Medical Association, the second Thursday of each month. D. E. Britten, 344 N. Ben Maddox, Visalia, Calif., secretary.

COLORADO—Denver Area Veterinary Medical Society, the fourth Tuesday of every month. Gene M. Bierhaus, 2896 S. Federal Blvd., Englewood, Colo., secretary-treasurer.

Northern Colorado Veterinary Medical Society, the first Wednesday of each month, in Fort Collins. Dr. James

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Voss, Veterinary Hospital, Colorado State University, Fort Collins, Colo., secretary.

DELAWARE—New Castle County Veterinary Association, the first Tuesday of each month at 9:00 p.m. in the Hotel Rodney, Wilmington, Del. A. P. Mayer, Jr., R.F.D. 2, Newark, Del., secretary-treasurer.

FLORIDA—Central Florida Veterinary Medical Association, the first Friday of each month at 8:00 p.m., place specified monthly. L. R. Poe, 753 W. Fairbanks Ave., Winter Park, Fla., secretary-treasurer.

Florida West Coast Veterinary Medical Association, the second Wednesday of each month at the Lighthouse Inn, St. Petersburg. William F. Casler, 2540 30th Ave., N., St. Petersburg, secretary-treasurer.

Jacksonville Veterinary Medical Association, the first Thursday of every month. Dodsons Restaurant, P. S. Roy, 4443 Atlantic Blvd., Jacksonville, Fla., secretary.

Northwest Florida Veterinary Medical Society, third Wednesday of each month, time and place specified monthly. T. R. Geci, 108B Catherine Ave., Pensacola, Fla., secretary.

Palm Beach Veterinary Society, the last Thursday of each month in the county office building at 810 Datura St., West Palm Beach. J. J. McCarthy, 500-25th Street, West Palm Beach, Fla., secretary.

Ridge Veterinary Medical Association, the fourth Thursday of each month in Bartow, Fla. Paul J. Myers, Winter Haven, Fla., secretary.

South Florida Veterinary Society, the third Wednesday of each month. Time and place specified monthly. Joe B. O'Quinn, 1690 E. 4th, Hialeah, Fla., secretary.

Suwannee Valley Veterinary Association, the fourth Tuesday of each month, Hotel Thomas, Gainesville. W. B. Martin, Jr., 3002 N. W. 6th St., Gainesville, Fla., secretary.

Volusia County Veterinary Medical Association, the fourth Thursday of each month. A. E. Hixon, 131 Mary St., Daytona Beach, Fla., secretary.

GEORGIA—Atlanta Veterinary Society, the third Thursday of each month at the Elk's Home, 726 Peachtree St., Atlanta. Donald C. Ford, Forest Park, secretary.

Georgia-Carolinas Veterinary Medical Association, the second Monday of each month at 8:00 p.m., at the Town Tavern, Augusta, Ga. H. G. Blalock, Jr., 2190 Highland Ave., Augusta, secretary.

ILLINOIS—Chicago Veterinary Medical Association, the second Tuesday of each month. Charles H. Armstrong, 1021 Davis St., Evanston, secretary.

Eastern Illinois Veterinary Medical Association, the first Thursday of March, June, September, and December. A one-day clinic is held in May. Alfred G. Schiller, Veterinary Clinic, University of Illinois, Urbana, secretary-treasurer.

INDIANA—Central Indiana Veterinary Medical Association, the second Wednesday of each month. Peter Johnson, Jr., 4410 N. Keystone Ave., Indianapolis 5, secretary.

Michiana Veterinary Medical Association, the second Thursday of every month except July and December, at the Hotel LaSalle, South Bend, Ind. J. M. Carter, 3421 S. Main St., Elkhart, Ind., secretary.

Tenth District Veterinary Medical Association, the third Thursday of each month. J. S. Baker, P.O. Box 52, Pendleton, Ind., secretary.

IOWA—Cedar Valley Veterinary Medical Association, the second Monday of each month, except January, July,

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Coon Valley Veterinary Medical Association, the second Wednesday of each month, September through May, at 7:30 p.m., Cobblestone Inn, Storm Lake, Iowa. Robert McCutcheon, Holstein, secretary.

East Central Iowa Association, the second Thursday of each month at 6:30 p.m., usually in Cedar Rapids, Iowa. Dr. J. G. Irwin, Iowa City, secretary.

Fayette County Veterinary Medical Association, the third Thursday of each month at 6:30 p.m. in West Union, Iowa. H. J. Morgan, West Union, secretary.

Lakes Veterinary Association, the first Tuesday of each month, September through May, at 6:30 p.m., at the Gardsen Hotel, Estherville, Iowa. Barry Barnes, Milford, secretary.

North Central Iowa Veterinary Medical Association, the third Thursday of April, at the Warden Hotel, Fort Dodge, Iowa. H. Engelbrecht, P. O. Box 797, Fort Dodge, secretary.

Northeast Iowa-Southern Minnesota Veterinary Association, the first Tuesday of February, May, August, and November at the Wisneslick Hotel, Decorah, Iowa, 6:30 p.m. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Northwest Iowa Veterinary Medical Association, the second Tuesday of February, May, September, and December, at the Community Bldg., Sheldon. W. Ver Meer, Hull, secretary.

Southeastern Iowa Veterinary Association, the first Tuesday of each month at Mt. Pleasant, Iowa. Warren Kilpatrick, Mediapolis, secretary.

Southwestern Iowa Veterinary Medical Association, the first Tuesday of April and October, Hotel Chieftain, Council Bluffs, Iowa. J. P. Stream, Creston, secretary.

Upper Iowa Veterinary Medical Association, the third Tuesday of each month at 7:00 p.m., at All Vets Center, Clear Lake, Iowa. Richard Baum, Osage, secretary.

KENTUCKY—Central Kentucky Veterinary Medical Association, the first Wednesday of each month. R. H. Folsom, P.O. Box 323, Danville, Ky., secretary.

Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday of each month in Louisville or within a radius of 50 miles, except January, May, and July. G. R. Comfort, 2102 Reynolds Lane, Louisville, Ky., secretary-treasurer.

MARYLAND—Baltimore City Veterinary Medical Association, the second Thursday of each month, September through May (except December), at 9:00 p.m., at the Park Plaza Hotel, Charles and Madison St., Baltimore, Md. Norman Herbert, 3506 Joann Drive, Baltimore 7, Md., secretary.

MICHIGAN—Central Michigan Veterinary Medical Association, the first Wednesday of every month at 7 p.m. Frank A. Carter, P.O. Box 78, Carson City, Mich., secretary.

Mid-State Veterinary Medical Association, the fourth Thursday of each month with the exception of November and December. Robert E. Kader, 5034 Armstrong Rd., Lansing 17, Mich., secretary.

Saginaw Valley Veterinary Medical Association, the last Wednesday of each month. S. Correll, Rt. 1, Midland, Mich., secretary.

Southeastern Veterinary Medical Association, the fourth Wednesday of every month, September through May.

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Gilbert Meyer, 14003 E. Seven Mile Rd., Detroit 5, Mich., secretary.

MISSOURI—Greater St. Louis Veterinary Medical Association, the first Friday of each month (except July and August), at the Coronado Hotel, Lindell Blvd. and Spring Ave., St. Louis, Mo., at 8 p.m. Edwin E. Epstein, 4877 Natural Bridge Ave., St. Louis 15, Mo., secretary.

Kansas City Veterinary Medical Association and Kansas City Small Animal Hospital Association, the third Thursday of each month at the Hotel President, Kansas City, Mo. Frank A. O'Donnell, Parkville, Mo., secretary-treasurer.

NEVADA—Western Nevada Veterinary Society, the first Tuesday of each month. Paul S. Silva, 1179 Airport Road, Reno, Nev., secretary.

NEW JERSEY—Central New Jersey Veterinary Medical Association, the second Thursday of November, January, March, and May at Old Hights Inn, Hightstown, N. J. David C. Tudor, Cranbury, N. J., secretary.

Metropolitan New Jersey Veterinary Medical Association, the third Wednesday evening of each month from October through April, except December, at the Irvington House, 925 Springfield Ave., Irvington, N.J. Bernard M. Weiner, 787 Clinton Ave., Newark, N.J., secretary.

Northern New Jersey Veterinary Association, the fourth Tuesday of each month at the Elks Club, Hackensack. Burritt Lupton, 569 Franklin Ave., Wyckoff, secretary.

Northwest Jersey Veterinary Society, the third Wednesday of every odd month. G. L. Smith, P.O. Box 938, Trenton, N.J., secretary.

Southern New Jersey Veterinary Medical Association, the fourth Tuesday of each month at the Collingswood

Veterinary Hospital, Collingswood. R. M. Sauer, secretary.

NEW MEXICO—Bernalillo County Veterinary Practitioners Association, third Wednesday of each month, F&V Club, Albuquerque, N.M. Jack Ambrose, 3018 N. Rio Grande Blvd., Albuquerque, secretary-treasurer.

NEW YORK—New York City, Inc., Veterinary Medical Association of, the first Wednesday of each month at the New York Academy of Sciences, 2 East 63rd St., New York City. C. E. DeCamp, 43 West 61st St., New York 23, N. Y., secretary.

New York State Veterinary College, Annual conference for veterinarians. Cornell University, Ithaca. W. A. Hagan, New York State Veterinary College, Cornell University, Ithaca, N. Y., dean.

Monroe County Veterinary Medical Association, the first Thursday of even-numbered months except August. Irwin Bircher, 30 University Ave., Rochester, N. Y., secretary.

NORTH CAROLINA—Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel, Greensboro. W. R. Dobbs, Box 869, Albemarle, secretary.

Eastern North Carolina Veterinary Medical Association, the first Friday of each month, time and place specified monthly, Byron H. Brow, Box 453, Goldsboro, N. Car., secretary.

Piedmont Veterinary Medical Association, the last Friday of each month. T. L. James, Box 243, Newton, N. Car., secretary.

Twin Carolinas Veterinary Medical Association, the third Friday of each month at Orange Bowl Restaurant, Rockingham, N. Car., at 7:30 p.m. J. E. Currie, 690 N. Leak St., Southern Pines, N. Car., secretary.

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Western North Carolina Veterinary Medical Association, the second Thursday of every month at 7:00 p.m. in the George Vanderbilt Hotel, Asheville, N. Car. Vilu Lind, 346 State St., Marion, N. Car., secretary.

OHIO—Cincinnati Veterinary Medical Association, the third Tuesday of every month at Shuller's Wigwam, 6210 Hamilton Ave., at North Bend Road, G. C. Lewis, Cincinnati, Ohio, secretary-treasurer.

Columbus Academy of Veterinary Medicine, every month, September through May. E. M. Simonson, Columbus, Ohio, secretary-treasurer.

Cuyahoga County Veterinary Medical Association, the first Wednesday in September, October, December, February, March, April and May, at 9:00 p.m. at the Carter Hotel, Cleveland, Ohio. F. A. Coy, Cleveland, Ohio, secretary.

Dayton Veterinary Medical Association, the third Tuesday of every month. O. W. Fallang, Dayton, secretary.

Killbuck Valley Veterinary Medical Association, the first Wednesday of alternate months beginning with February. D. J. Kern, Killbuck, Ohio, secretary-treasurer.

Mahoning County Veterinary Medical Association, the fourth Tuesday of each month, at 9:00 p.m., Youngstown Maennerchor Club, Youngstown, Ohio. Sam Segall, 2935 Glenwood Ave., Youngstown, secretary.

Miami Valley Veterinary Medical Association, the first Wednesday of December, March, June, and September. J. M. Westfall, Greenville, Ohio, secretary-treasurer.

North Central Ohio Veterinary Medical Association, the last Wednesday of each month except during the summer. R. W. McClung, Tiffin, Ohio, secretary-treasurer.

Northwestern Ohio Veterinary Medical Association, the last Wednesday of March and July. C. S. Alvanos, Toledo, Ohio, secretary-treasurer.

Stark County Veterinary Medical Association, the second Tuesday of every month, at McBrides Emerald Lounge, Canton, Ohio. M. L. Willen, 4423 Tuscarawas St., Canton, Ohio, secretary.

Summit County Veterinary Medical Association, the last Tuesday of every month (except June, July, and August), at the Mayflower Hotel, Akron, Ohio. M. L. Scott, Akron, Ohio, secretary-treasurer.

Tri-County Veterinary Medical Association, the fourth Wednesday of January, May, and September. Mrs. R. Slusher, Mason, Ohio, secretary-treasurer.

OKLAHOMA—Oklahoma County Veterinary Medical Association, the second Wednesday of every month, 7:30 p.m., Patrick's Food's Cafe, 1016 N.W. 23rd St., Oklahoma City. Forest H. Stockton, 2716 S.W. 29th St., Oklahoma City, Okla., secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month in Directors' Parlor of the Brookside State Bank, Tulsa, Okla. Arlen D. Hill, 5302 E. 11th St., Tulsa, Okla., secretary.

Tulsa Association of Small Animal Veterinarians, first and third Mondays, City-County Health Dept. T. E. Messier, 3104 E. 51st St., Tulsa, Okla., secretary.

OREGON—Portland Veterinary Medical Association, the second Tuesday of each month, at 7:30 p.m. Ireland's Restaurant, Lloyd's, 718 N.E. 12th Ave. Portland. Donald L. Moyer, 8415 S.E. McLoughlin Blvd., Portland 2, Ore., secretary.

Williamette Veterinary Medical Association, the third Tuesday of each month, except July and August, at the Marion Hotel, Salem. Marvin M. Corff, McMinnville, Ore., secretary.

PENNSYLVANIA—Keystone Veterinary Medical Association, the fourth Wednesday of each month at the Uni-



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versity of Pennsylvania School of Veterinary Medicine. Raymond C. Snyder, N.E. Corner 47th St. and Hazel Ave., Philadelphia 43, Pa., secretary.

Lehigh Valley Veterinary Medical Association, the first Thursday of each month. Stewart Rockwell, 10th and Chestnut Sts., Emmaus, Pa., secretary.

Pennsylvania Northern Tier Veterinary Medical Association, the third Wednesday of each odd numbered month. R. L. Michel, Troy, Pa., secretary.

SOUTH CAROLINA—Piedmont Veterinary Medical Association, the third Wednesday of each month at the Fairforest Hotel, Union, S. Car. Worth Lanier, York, S. Car., secretary.

Georgia-Carolina Veterinary Medical Association—see GEORGIA.

TEXAS—Coastal Bend Veterinary Association, the second Wednesday of each month. J. Marvin Prewitt, 4141 Lexington Blvd., Corpus Christi, Texas, secretary.

VIRGINIA—Central Virginia Veterinarians' Association, the third Thursday of each month at the William Byrd Hotel in Richmond at 8:00 p.m. M. R. Levy, 312 W. Cary Ct., Richmond 20, Va., secretary.

Northern Virginia Veterinary Conference, the second Tuesday of each month. Francis E. Mullen, 1130 S. Main St., Harrisonburg, Va., secretary-treasurer.

Northern Virginia Veterinary Society, the second Wednesday of every third month. Meeting place announced by letter. H. C. Newman, Box 145, Merrifield, secretary.

AVMA Research Fellowships Available

The Council on Research of the AVMA announces the availability of a number of fellowships for postgraduate training for the academic year, 1959-1960.

The recipient of a fellowship must be a veterinarian and a citizen of the United States or Canada. Veterinary students who expect to graduate at the end of the current school year and who wish to follow a career in research may apply for a fellowship.

The latest date for filing the completed application is Feb. 15, 1959. Approximately one month is required for processing completed applications after receipt by the secretary of the Council. Qualified persons should secure and submit applications as early as possible to insure their file being complete for presentation to the Committee on Fellowships.

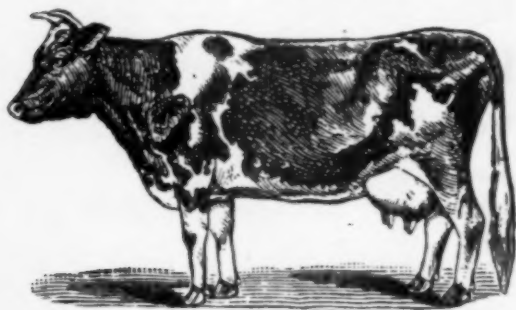
The Committee on Fellowships of the Council on Research will meet in March to consider applications, and the awards will be announced soon afterward. The stipend will be determined in each case by the needs of the individual, the location of the school in which he proposes to work, and other factors. In general, the stipends range from \$100 monthly and upward.

Any qualified person interested in graduate training may obtain application blanks and other information by writing to Secretary, AVMA Council on Research, C. H. Cunningham, College of Veterinary Medicine, Michigan State University, East Lansing, Mich.

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Southwest Virginia Veterinary Medical Association, the first Thursday of each month. D. F. Watson, Blacksburg, secretary.

WASHINGTON—Seattle Veterinary Medical Association, the third Monday of each month, Magnolia American Legion Hall, 2870 32nd W., Seattle. Roy C. Toole, 10415 Main St., Bellevue, secretary.

South Puget Sound Veterinary Association, the second Thursday of each month except July and August. B. D. Benedictson, 3712 Plummer St., Olympia, Wash., secretary.

WEST VIRGINIA—Kyowva (Ky., Ohio, W. Va.) Veterinary Medical Association, the third Thursday of each month in the Hotel Pritchard, Huntington, W. Va., at 8:30 p.m. Harry J. Fallon, 200 5th St., W. Huntington, W. Va., secretary.

WISCONSIN—Central Wisconsin Veterinary Medical Association, the second Tuesday of each quarter (March, June, Sept., Dec.). D. F. Ludvigson, Ridgeland, Wis., secretary.

Dane County Veterinary Medical Association, the second Thursday of each month. Dr. E. P. Pope, 409 Farley Ave., Madison, Wis., secretary.

Milwaukee Veterinary Medical Association, the third Tuesday of each month, at the Half-Way House, Blue Mound Rd. Dr. R. H. Steinkraus, 7701 N. 59th St., Milwaukee, Wis., secretary.

Northeastern Wisconsin Veterinary Medical Association, the third Wednesday in April. William Madson, 218 E. Washington St., Appleton, Wis., secretary.

Rock Valley Veterinary Medical Association, the first Wednesday of each month. W. E. Lyle, P. O. Box 107, Deerfield, Wis., secretary.

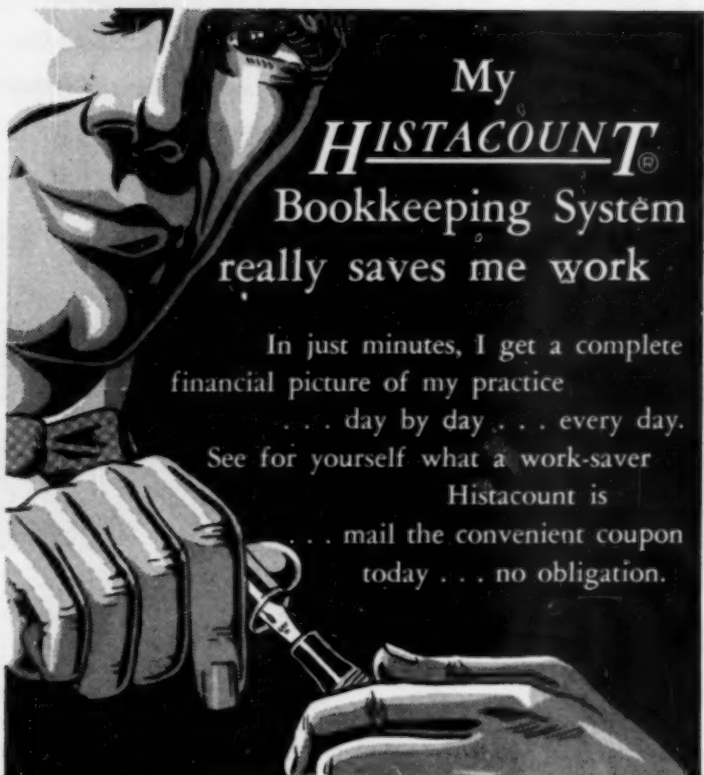
Southeastern Veterinary Medical Association, the third Thursday of each month. John R. Curtis, 419 Cook St., Portage, Wis., secretary.

Wisconsin Valley Veterinary Medical Association, the second Tuesday of every other month. E. S. Scobell, Rt. 2, Wausau, Wis., secretary.

An Oral Treatment for Ringworm

The ineffectiveness, *in vivo*, of agents with antifungal activity *in vitro*, is probably due to inability to penetrate the keratin of the skin and hair. The successful treatment of experimentally induced ringworm in animals by the oral administration of griseofulvin, an antibiotic, is reported. It was given orally (60 mg./kg.) to guinea pigs ten days after they were infected with *Microsporum canis*. Clinical benefit was evident within four days and only a few follicles remained infected by the eighth day. Under a Wood's light, the infected hairs fluoresced only at the tips, indicating that the portion of the hair which had grown during treatment was resistant to the dermatophyte.

This antibiotic is equally effective when given orally to guinea pigs experimentally infected with *Trichophyton mentagrophytes*, and also against *Trichophyton verrucosum* ringworm induced in cattle.—*Nature* (Aug. 16, 1958): 476.



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References: 1. Kakavas, J. C.; Roberts, H. D. B.; de Courcy, S. J. and Ewing, D. L.: *J. Am. Vet. M. Ass.* 119:203 (Sept.) 1951. 2. Kakavas, J. C.: *Antibiotics Annual 1954-1955*, New York, Medical Encyclopedia, Inc., 1955, p. 323. 3. Mires, M. H. and Chadwick, R. H.: *Vet. News* 10:3 (Jan.-Feb.) 1947. 4. Mires, M. H.: *J. Am. Vet. M. Ass.* 117:49 (July) 1950. 5. Mires, M. H.: *Vet. News* 14:9 (May-June) 1951. 6. Roberts, H. D. B.; Kakavas, J. C. and Biddle, E. S.: *N. Amer. Vet.* 34:247 (April) 1953.

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Make your diagnosis from the picture below — then turn page ►



Fig. 1—A ventrodorsal radiograph of a dog.

History.—A female Terrier type dog, 10 months old, cried and seemed to be in pain when trying to defecate. A round smooth object could be palpated in the rectum. A dorsoventral radiograph was taken.

Here Is the Diagnosis

(Continued from preceding page.)

Diagnosis.—Two radiopaque objects present in the rectum. When these were passed, they proved to be marbles.

Comment.—It is not uncommon for dogs, especially pups, to swallow foreign objects. If they are round, smooth, and not too large, they are passed without difficulty. Objects such as pieces of rubber and rubber baby nipples frequently cause intestinal obstruction and since they are not radiopaque they offer a problem in diagnosis.

This case report was submitted by Dr. William A. Howarth, Littleton, Colo.

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REFERENCES: 1. Bull, W. S.; N. Amer. Vet., in press. 2. Henry, R. T., and Blockburn, E. G.; Vet. Med., in press.

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*Jones, S. V.; Belloff, G. B., and Roberts, H. D. B.: Vet. Med. 51:413 (Sept.) 1956.

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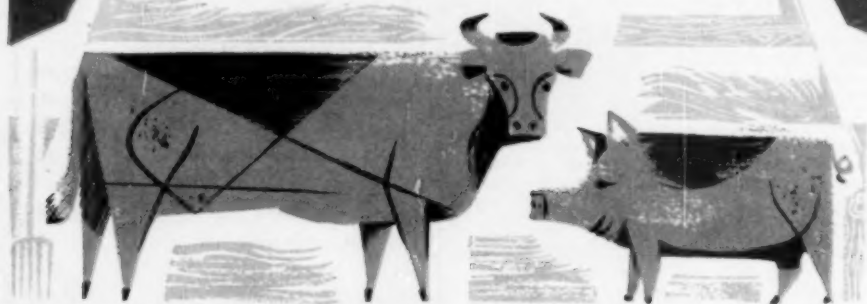
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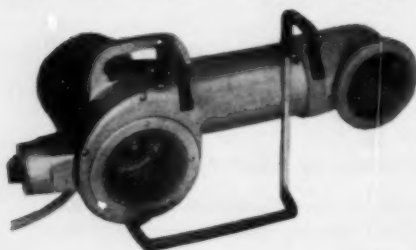
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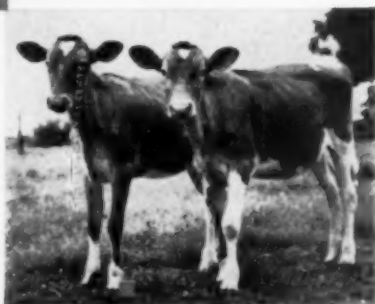
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A ▶	9%	large	very poor
B ▶	10%	medium	very poor
C ▶	7%	fine	fair
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Jen-Sal ▶	13%	very fine	excellent

maximum tissue concentration for dependable immunity

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